

# ENVIRONMENTAL *Technical Applications Center*

TECHNICAL NOTE  
70-10

ETAC

A  
SELECTED ANNOTATED BIBLIOGRAPHY  
OF ENVIRONMENTAL STUDIES OF  
ARGENTINA, CHILE, AND URUGUAY

Compiled by  
Vincent J. Croesi

DECEMBER 1970

METEOROLOGY



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## INTRODUCTION

This bibliography was compiled as a by-product of the regular reference-researching that is one aspect of the normal workload of the Technical Information Section, USAF ETAC. Many of the abstracts herein were taken from the publications themselves, many others, or parts of abstracts, from Meteorological and Geostrophysical Abstracts (Am. Met. Soc.), and others were prepared by members of the Technical Information Section of USAF ETAC. The individuals below are credited with the preparation of one or more abstracts shown in this publication.

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Since only a limited time was available to the author to compile this reference listing, it is very possible that, in some cases, an author's best work is not the one I have included. Furthermore, some important papers, reports, summaries, etc., undoubtedly have been completely overlooked in my search and I offer an apology for such unintentional oversights.

This bibliography is divided into four sections comprising (I) General References on South America, (II) Argentine, (III) Chile, and (IV) Uruguay. All entries in the General Reference section have the language of the publication noted in the left-hand margin. Those in the remaining sections are in Spanish unless otherwise noted. It is possible that one or more of the articles or publications listed may have been translated into English but the translation did not come to the author's attention.

For the reader's convenience, a subject index is provided. Each item lists a source at which the publication may be located either by library card, catalogue number, AD number, or other indicator. All entries were located within the Washington, D.C. Metropolitan Area. Abbreviations denoting the various libraries are identified below:

Index to Source Symbols

AD Numbers	National Technical Information Service Springfield VA 22151
DAS	Atmospheric Sciences Library, NOAA Silver Spring MD 20910
DAS Pool	Periodical Collection Atmospheric Sciences Library, NOAA Silver Spring MD 20910
DLC	Library of Congress Washington DC 20540

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### Purpose

USAF ETAC Technical Notes are published by the USAF Environmental Technical Applications Center to disseminate aerospace sciences information to units of the Air Weather Service. Subject matter contained in these Technical Notes, while pertinent, is not deemed appropriate for publication as Air Weather Service Technical Reports which are confined to those studies, reports, techniques, etc., of a more permanent and specific nature. Technical Notes include such material as wing seminar listings, bibliographies, special data compilations, climatic studies, and certain USAF ETAC project reports which may be of special interest to units of the AWS organization. This series is published under the provision of AFR 6-1 and AWSR 80-2, as amended.

### Distribution

Technical Notes will normally be given the same distribution as AWS Technical Reports which includes all AWS units through detachment level. Additional special distribution may be provided certain issues when the subject matter is believed to warrant wider dissemination within the scientific community. A smaller distribution of the Notes will be made when the area of interest and applicability is considered limited.

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## Index to Source Symbols (cont)

DNAL	Agricultural Library Washington DC 20250
DFU	Pan American Union Library Washington DC 20006
Foreign Section (EDS)	Environmental Data Service, NOAA Silver Spring MD 20910
IPB	Information & Publications Branch USAF ETAC Washington DC 20333
TOPOCOM	US Army Topographic Command Brooks Lane Washington DC 20315

## SUBJECT INDICES

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ENVIRONMENTAL PUBLICATIONS  
OF ARGENTINA

The Servicio Meteorológico Nacional [National Weather Service] of Argentina issues certain periodic and/or aperiodic publications as, in a lesser number, do the "Dirección de Meteorología Geofísica e Hidrología" [Directorate of Meteorology, Geophysics, and Hydrology] and the "Servicio de Hidrografía Naval" [Naval Hydrographic Service]. The items listed below are some of these.

DAILY

Carta del Tiempo [Weather Chart]

MONTHLY

Boletín Climatológico [Climatological Bulletin]

...Precipitation values from about 300 stations, temperature and humidity values from about 70 stations.

Resumen sinóptico de la circulación atmosférica del mes correspondiente a la región meridional de América del Sur [Synoptic Summary of the Atmospheric Circulation over the Meridional Region of South America During the Month].

...In extenso radiosonde observations (12 GMT) from two stations - standard isobaric surfaces up to about 25 mb and significant levels; review of the aerological situation.

ANNUAL

Anales climatológicos [Climatological Annual]

...Monthly and annual summaries for about 180 climatological stations. Data for 1928-1932 and 1933-1937 were published in joint volumes. Data for 1938-1941, not published.

Anales hidrológicos - Datos pluviométricos [Hydrological Annual - Rainfall Data]

...Monthly and annual precipitation values for about 2,300 stations; annual isohyet charts.

Anales hidrológicos - Datos pluviométricos y freáticos [Hydrological Annual]

...Daily stage measurements of the main rivers and lakes in the country; depth of the water table at 19 stations.

OCCASIONAL

Datos climatológicos y geomagnéticos - Islas Orcadas del Sur, 1903-1950 [Climatological and Geomagnetic Data for the South Orkney Islands]

...Daily, monthly, and annual values of climatological elements and their averages, for the period 1903-1950, for the South Orkney Islands station. Geomagnetic data complete the volume.

El régimen pluviométrico de la República Argentina, 1913-1937 [Precipitation Regime of the Argentine Republic, 1913-1937].

...Monthly and annual averages of precipitation and of number of days with precipitation  $\geq 1.0$  mm for about 810 stations. Review of the precipitation régime. Charts of average monthly and annual isohyets.

Estadísticas de visibilidad, 1934-1945 [Visibility Statistics, 1934-1945].

...Monthly and annual frequency distribution of visibility (8, 14, 20 OT) for various periods for about 180 stations.

Estadísticas Climatológicas [Climatological Statistics], 1928-1937, 1901-1950, 1941-1950, 1951-1960.

Monthly and annual climatological summaries for the period shown. The volume for 1901-1950 contains data for 44 stations; the volumes for 1928-1937, 1941-1950, and 1951-1960 give data for 105, 160, and 156 stations, respectively.

Datos Pluviométricos, 1921-1950 [Precipitation Data, 1921-1950]

...Monthly and annual precipitation summaries for about 980 stations and diverse precipitation statistics for a varying number of stations.

ENVIRONMENTAL PUBLICATIONS  
OF CHILE

The Oficina Meteorológica de Chile [Meteorological Office of Chile] issues certain periodic and/or aperiodic publications. The items listed below are some of these.

DAILY

Boletín y Carta Diaria del Tiempo [Weather Bulletin and Charts]

...12 GMT surface isobaric chart covering Chile, Argentina, Peru, and Brazil; observations from 36 synoptic stations, a synoptic review, and a forecast for the following 24 hours.

MONTHLY

Boletín Mensual del Tiempo [Monthly Weather Bulletin]

...Monthly weather review with rainfall statistics and the appropriate text.

ANNUAL

Anuario meteorológico de Chile [Meteorological Annual of Chile]

OCCASIONAL

Estudio critico sobre los promedios publicados por el Instituto Meteorológico y la Oficina Meteorológica de Chile [A Critical Study on the General Publications of the Meteorological Institute of the Chilean Meteorological Office]

Barografia de Chile [Chilean Barometry]

ENVIRONMENTAL PUBLICATIONS  
OF URUGUAY

The National Weather Service of Uruguay issues certain periodic and/or aperiodic publications. The items listed below are some of these.

BI-ANNUAL

Revista Meteorologica [Meteorological Review]

...Contains various summarized climatological data.

OCCASIONAL

Apuntes de estadigrafia climatologica, conintercalacion de criterios y tesis personales [Notes on Climatological Statistics, with the Interrelation between Criteria and Personal Thesis]

Estatistica de Techo y Visibilidad [Ceiling and Visibility Statistics]

Frecuencias y Valores Medios para la Insolacion y Nobosidad en Montevideo [Frequency and Mean Values of Insolation and Cloudiness in Montevideo]

Sailing Directions for South America

U.S. Hydrographic Office

HO #25

Volumes I, II, and III

Volume I, 1967 (HO #23) contains monthly and annual summaries (POR 6 to 24 years) of MSL pressure; mean, mean extremes, and extreme temperatures; mean RH at 07 and 14Z; mean cloud amounts (tenths); mean no. of days with < 2/8 and > 6/8 cloud cover; precipitation, mean greatest and least amounts, max in 24-hr period; mean no. of days with precipitation  $\geq$  0.01 inch; mean no. of days with snow  $\geq$  0.004 inch; wind direction frequency (8 pts & calm); mean wind force (Beaufort) at 07 and 14Z; mean no. of days with wind speed  $\geq$  34 kt; mean no. of days with visibility <  $\frac{1}{2}$  nm. Places listed are Buenos Aires and Paraná, Argentina; and Montevideo, Uruguay.

Volume II, 1956, similar to Volume I but for Cape Roper, Isla Año Nuevo, Los Evangelistas, Isla Guafo, Punta Arenas, and Dungeness, Chile; Ushuaia, San Martin, and Puerto Deseado, Argentina.

Volume III, 1960, has similar summaries but for Arica, Antofagasta, Valparaiso, Isla de Juan Fernández, Valdivia, and Ancud (Punta Corona) Library Reference #DAS M82/8 U58S Vol I, II, III



## PREVIOUSLY PUBLISHED

*Bibliographies*

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These previously published bibliographies, noted during our reference search, pertain to the climatology or the environment of these South American countries and are listed below for the added convenience of the reader.

1952

Rice, Mary L. Selective Annotated Bibliography on the Climates of Paraguay, Uruguay and Argentina. "Meteorological Abstracts and Bibliography", Vol 3, No. 3, Mar 1952, Boston, Mass. pp 243-290. DAS M(016) A512m.

...This bibliography, which includes 254 references, is divided into five sections: 1) publications dealing with South America; 2) studies concerning the Rio de la Plata region and the coasts of Uruguay and Argentina as a whole; and publications treating 3) Uruguay, 4) Paraguay, and 5) Argentina individually. A subject index is provided. In English. (DLB)

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1956

Universidad de Chile. Bibliografia Geografia Chilena: Obras y Articulos Publicados en 1956 [Bibliography of Chilean Geography: Books and Articles Published in 1956], Instituto de Geografia de la Universidad de Chile, Informaciones Geograficas, Santiago, 1956, pp 140-193. DLC G1.I64.

...Contains a number of references pertaining to the physical geography of Chile. Additional references deal with topography, climate, and natural resources. In Spanish. (DLB)

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1961

Zimmerman, A. and J.Y. Wang. Bibliography for Agrometeorological Studies on South America: The First Collection 1960, University of Wisconsin, Dept. of Meteorology and Soils, Madison, 1961, 23p. DLC Z6683.A4Z5 and DAS M(016) Z72b1.

...This bibliography contains numerous references on South American agrometeorological studies. Although the primary emphasis is on agrometeorology, 249 references deal with climatology, hydrology, geography, ecology, etc. References are divided into two sections, printed matter and maps. The references (which are not annotated) are listed by country and general area. In English. (DLB)

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1964

Pan American Union, Inventory of Information Basic to the Planning of Agricultural Development in Latin America: Selected Bibliography, CIDA, published by the Organization of American States, Washington, D.C., Dec 1964. 187 p, 5083 refs. DPU 016:M:62 Plyi.

...This Selected Bibliography constitutes a list of Publications consisting chiefly of the books, articles, and documents found useful in preparation of the Inventory reports. Publications prior to 1950 have been eliminated, along with a large number of bulletins, reports and articles which are out of date or have only passing interest. Very specialized works, save those which examine extensive agricultural areas or which contain also data of general interest, have likewise been omitted.

The references were collected during the search for pertinent material during 1962 and early 1963. As preparation of the reports for the individual countries proceeded during 1963 and into 1964, some additional publications came to light and some new ones were published. These are listed in a Supplementary Bibliography. In English. (fr. Author)

1968

Smith, A.L., Jr. A Climatological Bibliography of the South Atlantic Ocean Area Including Certain Coastal Countries. ETAC Technical Note 68-4, Washington, D.C. Nov 1968. AD 683761.

...This bibliography, which encompasses a vast ocean area, contains 11 entries for Argentina, three for Chile, and two for Uruguay. In English. (VJC)

## *General References*

### *South America*

1. Aguilar, Jose. Atlas Universal Aguilar [Aguilar's World Atlas] Graficolas y Laboratorio, Dept. Cartografico, S.A. de Ediciones, Madrid, 1960. 116 p. DPU Ref G 1019.A4.

Spanish

...Contains maps of vegetation, climate, and terrain. South American climatic maps present temperature (isotherms for January and July), precipitation, and climatic regions. (DLB)

2. Alvarez, J. A. Some Features of Jet-Streams over the Southern Parts of South America, "Notos" Vol. 11, 1962, pp 67-75. 9 refs, 8 figs, 4 tables. DAS M(05) S726no

English

...The geostrophic approximation was used in conjunction with the few available upper winds over the southern parts of South America to prepare 110 isotach analyses for the period August to November, 1958. The observed jet streams are studied in relation to surface fronts, to the isotherms at two intermediate standard levels, and to cyclogenetic and precipitation areas. The geographical distribution of the jet-streams is given. Most features are found to be in agreement with observations elsewhere. The correlation between wind maxima and middle and high cloud is not in good agreement with northern hemisphere observations. In this connection, it is concluded that special cloud observations are required. (Author)

3. Ashbel, Dov et al. Soil Temperature in Different Latitudes and Different Climates. The Hebrew U. of Jerusalem, Israel, 1965, 221p. Graphs. DAS M25.4 A799s.

English

...Soil temperatures around the world are presented. Those of interest to this bibliography are mean monthly soil-profile temperatures for Buenos Aires, Concordia, Mendoza, Rosario, San Julian, and Tucuman, Argentina; Santiago, Chile; and Montevideo, Uruguay. (VJC)

4. Chang, Jen-Hu, Ground Temperature. Vol. 1 & 2, Blue Hill Met. Obsy., Harvard U., Milton, Mass., June 1958. 300p and 196p. Ref., tables, maps. DAS M25 B658gr.

English

...Volume I contains several world maps of soil temperature during the mid-season months at 10-, 30- and 120-cm depths. Vol. 2 has tables of summarized monthly soil temperature for various depths for 38 stations in Argentina, 3 in Chile, plus Montevideo, Uruguay. (VJC)

5. Critchfield, H.J. General Climatology. Second Edition, Prentice-Hall, Englewood Cliffs, N.J., 1966. 465 p. Figs, photos, tables, maps, biblio. DAS M8C934ge and DAC Q0981.C73.

English

...This general textbook on climatology discusses the physical elements; world climates; relations of climate and life; and relations of climate to transportation, industry, and communications. Several world maps, such as total annual insolation, sea-level temperatures for Jan and Jul, sea-surface temperatures for Feb and Aug, mean annual precipitation, mean sea-level pressure for Jan and Jul, and mean surface-wind flow for Jan and Jul are included. Textual descriptions are given for Argentina and Chile. Climatological data on monthly precipitation and temperature are provided for Arica and Valdivia, Chile; Buenos Aires and Ushuaia, Argentina; and Montevideo, Uruguay. (VJC)

6. Gavrilova, Z.I. (ed.) Aeroklimaticheskii spravochnik Iuzhnoi Ameriki. [Aeroclimatic Handbook of South America]. Nauchno-Issledovatel'skii Institut Aeroklimatologii. Gidrometeorologicheskoe Izdatel'stvo. Leningrad, 1968, 288p. DAS M87 G283ae.

Russian

...This handbook presents long-period monthly and annual summaries of aeroclimatological data obtained in South America at station level and at the isobaric surfaces 1000, 850, 700, 600, 500, 400, 300, 250, 200, 150, 100, 70 or 80, 50, 30, 25, 20, 10, 5 mb. Data are presented on atmospheric temperature, the characteristics of the inversion and isothermal layers, the lower tropopause boundary, and of the zero isotherm and multiples of the -10°C isotherms; and data on atmospheric density, specific humidity, and the wind characteristics for 13 stations. (Pt. ILD)

7. Graves, M.E. Temperature and Wind Statistics at 20,000 to 40,000 Ft for the Panama-Buenos Aires Route. Pan-American-Grace Airways, Inc., Meteorological Section, Lima, Peru, Mar 1960. DAS M06.7/8.

English

...At the end of 1959, two to two and one-half years of upper-air data had accrued at six South American RAWINSONDE/RADAR-TRACKING stations on the Panama-Buenos Aires route segments. These stations, plus Balboa, Canal Zone, were used to arrive at detailed temperature and wind-component figures at 30,000 ft of pressure altitude. This paper will expand the previous study, by similar processing methods, to include the following levels: 20,000, 25,000, 30,000, 35,000 and 40,000 ft of true altitude. The tables show the following types of information for each route segment bounded by a pair of upper-air stations: (1) mean monthly temperature, (2) monthly 96% temperature range, (3) mean monthly track wind component uncorrected for wind-induced drift, (4) monthly 96% range of track wind component, (5) mean monthly beam wind component, and (6) monthly 96% maximum beam wind component. (Pt. Author)

8. Howe, G.M. et al. Classification of World Desert Areas. U.S. Army Natick Labs, Tech Rpt 69-38 ES, ES 44, by the Travelers Res. Center, Inc., Hartford, Dec 1968. 104p, 192 refs, 19 figs, and maps. AD 683603. DAS M(055) U586ts ES 44.

English

...A definition of the meaning of terms used is given in the text. Fig 2 shows a world map of the distribution of certain dry climatic types.

## 8. (cont.)

Graphs depicting mean monthly temperature, no. of rainy days, aridity, and thermal types are given for Santiago del Estero and Sarmiento, Argentina. Pages 72 - 77 describe the climate, terrain, and vegetation regions of South America, while page 77 shows the South American distribution of dry climatic types. (VJC)

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9. Lauscher, Friedrich, Die globale Verteilung der Zahl der Tage Mit Niederschlag [Global Distribution of Number of Days with Precipitation], Wetter und Leben, Vienna, Vol. 17 (9/10), 1965, pp 197-203. Figs., tables, German and English summaries p 197. DAS M86W542

**German**

...The global average of number of days with precipitation is 106. Places of extreme values are Arica, Chile--nearly without precipitation; and Ponape, Carolines, with 311 days with precipitation per annum. (Author)

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10. Linke, Frans. Meteorologisches Taschenbuch [Meteorological Handbook], Leipzig, 1962, 806p. DAS M B351m.

**German**

...Contains monthly and annual tabular summaries of: mean pressure, mean temperature, and mean amount of precipitation for 6-7 stations (Iquique, Caldera, Valparaiso, Santiago, Ushuaia, Evangelistas, and Punta Arenas) within the period 1886-1940; 5 stations in Argentina and Montevideo, Uruguay within the period 1901-1940 (VJC)

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11. Mather, J.R. (Ed.) Publications in Climatology. Vol. XVIII, No. 2, C.W. Thornthwaite Associates, "Average Climatic Water Balance Data of the Continents," Pt. VIII S. America, Elmer, N.J., 1965. 136p. Tables, graphs, station list. DAS M8T513p V XVIII.

**English**

...A description is given of the method of computation, the data used, and problems of the water balance. The data included in the tables are the average monthly potential evapotranspiration, precipitation, storage of moisture in the soil, actual evapotranspiration, water deficit, and water surplus. Data for 144 Argentine stations, 60 Chilean stations, and 13 Uruguayan stations are included. (VJC)

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12. Rumney, G.R. Climatology and the World's Climate. The Macmillan Co., N.Y., London, 1968, 656p., ref., maps, tables, figs. DAS M82 R937c1.

**English**

...This primarily geographic textbook describes the climate of Argentina, Chile, and Uruguay. Tables and graphs show the monthly mean temperature and the precipitation amount by month and annually for many stations in Argentina and Chile. (VJC)

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13. Sadler, J. C. Average Cloudiness in the Tropics from Satellite Observations. Int. Indian Ocean Exp. Met. Monographs No. 2, East-West Center Press, Honolulu, 1969. 22 + plates, 14 refs, tables, graphs, maps. DAS M(055) I614me

English

...Two years of cloud observations following the launching of TIROS IX in late January 1965, are summarized between 30N and 30S, worldwide. Daily data were extracted over a 3456-point grid of 2.5 degrees long.-lat., and monthly averages computed. The distribution of cloudiness is discussed and tables and graphs depict the average monthly cloudiness summed around the globe between 30N and 30S and between 0 and 30 degrees in each hemisphere. Maps of monthly cloudiness are presented for 1965 and 1966, the two year average, and the difference between 1965 and 1966. (VJC)

14. Serra, Adalberto. Clima da America do Sul: estudo realizado no Conselho Nacional de Pesquisas. [Climate of South America: Study made by the National Research Council.] (1964?) 29p. DAS M82/8 S487cl

Spanish

...A narrative description of the following aspects and factors: relief; ocean currents; local and general circulation; winds; radiation and temperature; air masses; fronts, cyclones and anticyclones; and climatic regions of South America. (VJC)

15. Taljaard, J. J. Standard Deviation of Daily Sea-Level Pressure and 500-mb Height over the Southern Hemisphere during the IGY. "Notos", Vol. 15, 1966, pp 29-36. 9 figs, 9 refs, maps. DAS M(05) S726no

English

...A textual description is given of the charts and meridional profiles. The maps depict the seasonal standard deviations of sea-level pressure and the 500-mb geopotential height south of 15°S. Seasonal meridional profiles of zonally-averaged standard deviation of daily sea-level pressure and 500-mb geopotential height are graphed. (VJC)

16. Tossini, Luis. Sistema hidrografico y cuenca del Rio de la Plata [The Hydrographic System and the Basin of the Rio de la Plata], Sociedad Cientifica Argentina, Anales, 167(3/4); Mar/Apr 1959, pp 41-64. 2 figs, 4 tables. DAS P col

Spanish

...A description of the hydrographic system of the drainage basin of the Rio de la Plata. Rainfall data of each section are shown graphically. The fluvial regime of the primary tributaries is described and the hydrological data are tabulated. (EVS)

17. Troll, Carl. Das Pampaproblem in landschaftsökologischer Sicht [Problem of the Pampa in the Light of Land-scape Ecology], "Erdkunde," Bonn, June Vol. 22, No. 2, June 1968, pp 152-155. Refs. DAS P Col.

German

See Also: Lauer, Wilhelm, (Comment on) Heinrich Walter: Das Pampaproblem in vergleichend ökologischer Betrachtung und seine Lösung [Problem of the Pampa in Comparative Ecological Observation and its Solution], pp 155-159. Figs., table, refs. DAS P Col.

...A critical review of the literature dealing with the origin of the

## 17. (cont)

Argentinian-Uruguayan pampa and other tropical pampas. The causes of pampa formation are discussed. The potential evaporation obtained by means of tank measurements and Penman's formula for stations of the Argentinian-Uruguayan pampa, a map showing water deficit and surplus, and climograms of individual stations are given. (ILD)

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18. Union Panamericana, Dept. de Estadística, América en Cifras 1967. [America in Figures 1967.] Organ. de los Estados Americanos, Wash., D. C. 1967, 68p. ref, tables. DPU Ref 1960.758

**Spanish**

...Lists the mean monthly and annual temperature and precipitation for 31 Argentinian, 27 Chilean, and 6 Uruguayan stations summarized over a period from 1931-60. (VJC)

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19. USAF Hq. Seventh Weather Wing. Chile and Argentina Climatological Cloud Cover Maps for Aerial Photography. Climatology Branch, Scott AFB, Illinois, 1 June 1970. 40p. Station List and Map, 36 Maps, IPB Files.

**English**

...The period of record for the stations used to compile these maps varies from 4 to 12 years. These monthly maps for Argentina and Chile show the mean number of days with total cloud cover less than 1/8 at 0700, 1300, and 1900 local time. They are on an approximate scale of 1:17,500,000. (VJC)

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20. Velis, Claudio. Latin America and the Caribbean, A Handbook, Frederick A. Praeger, publ., New York, 1968, 840 p. maps. DPU Ref F 1408.V43.

**English**

...Several maps of physical features and regional divisions of Latin America. An annual rainfall map of Bolivia (inches and centimeters) is included. Each country has a small section devoted to climate. The information listed is: mean temperature of the hottest month; mean temperature of the coldest month; absolute maximum temperature, absolute minimum temperature; relative humidity at midday of hottest and coldest months; wettest months, driest months; and annual average rainfall. (DLB)

- 
21. World Meteorological Organisation. Energy from the Wind. Publication No. 32, Tech Paper 10, Geneva, 1954, 151p. Tables. DAS M(06) W927p

**English**

...Summarized mean seasonal and annual data (1901-40) of mean wind speed for stations in Argentina, Chile, and Uruguay. (VJC)

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# *Argentina*

## (1951-1969)

1. Argentina, Republic. Universidad Nacional de Cuyo, Boletín Agrometeorológico [Agrometeorological Bulletin], Nov 1960 - Jul 1965, Mendoza. Tables, graphs. DAS M(05) B688bol.

...These monthly publications list daily and monthly mean data for two stations Agrometeorologica (32°59'S; 68°52'W; 920 m) and El Sauces (32°51'S; 68°43'W; 655 m). The daily maximum, mean, minimum, and ground minimum temperature; total cloud cover; hours of sunshine; relative humidity; vapor pressure; precipitation; evaporation; and their monthly means are listed. In addition, the temperature of the soil is shown at the surface, .05-, .1-, .2-, .3-, .4-, .5-, 1- and 1.5-meter depths and monthly means are given as well as the daily prevailing wind direction and average speed. Some of these parameters are graphed. (VJC)

2. Argentina, Ministerio de Economía y Asuntos Agrarios, La Pampa, Argentine Republic, Direccion General de Estadísticas, Cencos, Promocion Economica y Finanzas, Buenos Aires, 1958 ... (1964) (pub. 1965). DLC HA958.L3A48.

...Average rainfall is given for 15 departments in La Pampa. Mean annual figures of measurable rainfall are given for 111 stations in La Pampa. (DLF)

3. Argentine Republic. Servicio Meteorológico. Datos de sondeos aerológicos [Aerological Sounding Data], Anos Internacionales del Sol Quieto 1 Jan 1964 al 31 Dec 1965, Publication B, No. 1 thru No. 12, Buenos Aires 1966. DAS M06.7/82 A691dat No. 1-12 1966.

...Contains upper-air data for Comandante Espora, Comodoro Rivadavia, Cordoba, Ezeiza, Neuquen, Resistencia, Ushuaia. (VJC)

4. Argentine Servicio de Hidrografia Naval. Normas e Instrucciones para la Observacion Meteorologica en el Mar [Models and Instructions for the Meteorological Observation on the Sea], N. 400 3d ed., Buenos Aires, 1969. 88 p, 30 tables DAS M01.1 A691no.

...This publication gives instructions for taking 3- and 6-hourly synoptic observations aboard ship. Definitions, codes, and instrument corrections are included. (VJC)



5. Argentina, República. Servicio Met. Nacional. Atlas Climático de la República Argentina [Climatic Atlas of the Argentine Republic], Buenos Aires 1960. 85 p, maps, station map. DAS M82.3/32A69lat1 (oversize).

...A brief explanation is given of the data used, the reliability of the maps, method of computation, and the periods used. These maps show the mean monthly and annual temperature, precipitation (amount and number of days), and relative humidity. Maps also give the annual, mean maximum, minimum, and absolute maximum and minimum temperature. Mean surface pressure maps are shown for Jan, Apr, Jul, Oct, and annual. Vapor-pressure maps are depicted for Jan, Jul, annual, and annual range. Winter, summer, and annual maps of clear ( $\leq 2/10$ ) and cloudy ( $\geq 8/10$ ) days are shown. (VJC)

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6. Argentine National Commission for the IQSY. National programme (in Argentina) for IQSY: report on the work done in 1964-65. International Years of the Quiet Sun, 4th Assembly, London, Jul 17-22, 1967. Papers (unnumbered). Issued 1967. 55 p. In Spanish. DAS M06.1/2 J35af.

...Outline of work performed and observations obtained in accordance with the program approved by the Argentine National Commission for the IQSY. The data obtained in the various disciplines were sent to World Data Centers and interested institutions. The results of aerological balloon soundings, measurements of solar radiation and ozone concentration, and studies of geomagnetism are cited. Attention was given to auroras, airglow, the ionosphere, solar activity, cosmic radiation and geomagnetically trapped particles, space research, and aeronomy. (Author)

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7. Argentina. Servicio de Hidrografia Naval. Servicio Meteorológico de la Armada Nacional; su empleo por las unidades de la Marina de Guerra [Meteorological Service of Nat'l Defense; its use by the units of the Navy] 2d ed. Buenos Aires, 1960, 29 p. 2 figs, (Pub. H-401). DAS M82/82 A691se.

...The cooperation of the different meteorological establishments, their general requirements, and procedures are described. The duties of the different organizations are defined. The organization of the 3 areas of responsibility, the meteorological services provided by the meteorological centers, and the duties of the forces and units with the meteorological service are surveyed. Publications stating basic regulations are listed. (OT)

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8. Argentina, Servicio Meteorológico Nacional. Estadísticas climatológicas [Climatological Statistics], Publicación B, No. 1, 1901-1950 and Publicación B, No. 3, 1941-1950. 1958. DAS M82.2/82 A691pu, Nos. 1 and 3.

...The format of the data tables is the same for both publications. No. 1 is based on the 50-year period 1901-50 for 44 stations while No. 3 is based on the 10-year period 1941-50 for 160 stations. Both contain the following monthly and annual data: station pressure (mb), mean; temperature, mean, mean max and min, also absolute max and min; vapor pressure (mb), mean; relative humidity, mean; cloudiness (tenths), mean; wind direction, percent frequency (8 pts, calm); wind speed (kt), mean; precipitation; and mean number of days; frost, clear ( $\leq 2/10$ ) overcast ( $\geq 8/10$ ). (WJM)

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9. Balay, Marciano A. El Río de la Plata entre la atmósfera y el mar [Rio de la Plata Between the Atmosphere and the Sea], Argentina. Servicio de Hidrografía Naval, (Pub.) H 621, 1961. 153 p, 62 figs, numerous tables, 28 refs. DAS M551.46 B171r.

...This monograph on the meteorology and hydrology of the Río de la Plata comprises the following; a brief review of the discovery and geography of the estuary of the Río de la Plata and a description of its bottom relief; a general discussion of the force, origin and periodicity of ocean tides and the effect of lunar-solar periods upon tides; tides in estuaries, oceanic tide waves, reference planes in the estuary, construction and characteristics of maps of cotidal lines of equal amplitude and of equal level for the Río de la Plata estuary; and the properties of the Río de la Plata tide; estuary currents, tide currents, outflow currents, and wind currents; the atmosphere over the estuary, normal development of weather over the estuary, effect of atmospheric pressure and of the wind upon the waters, and wind waves; the large floods of the Río de la Plata including frequencies of floods, frequencies of high and low tides, and sequence of major floods; characteristics of the major floods; and causes of large floods. (ILD)

10. Bonfils, Constante G. Los Suelos del Delta del Río Paraná [The Soils of the Parana River Delta], Instituto de Suelos y Agroecología, Publicación No. 82, Buenos Aires, 1962, pp 257-370. DLC S591.A75.

...Contains extensive data on the soils of the Paraná River delta. Climatic data are included in an outline of the regional thermal and precipitation regimes. Monthly average rainfall is given for 7 area stations. Temperature data include: mean monthly temperature, mean monthly maximum temperature, mean monthly minimum temperature, absolute maximum, and absolute minimum. (DLB)

11. Bonfils, Constante G., et al. Suelos y Erosión en la Region Pampeana Semi-Árida [Soils and Erosion in the Semi-Arid Pampas Region], Instituto de Suelos y Agroecología, Publ. No. 65, Buenos Aires, 1960, 348 p. DLC S591.A75.

...This study investigates the soil types and soil mechanics of the Argentine Pampas. The regional precipitation regime is discussed in relation to erosion. A descriptive summary of climate is presented. (DLB)

12. Brazol, Demetrio. Bosquejo bioclimático de la Republica Argentina [Bioclimatic Sketch of Argentina], Meteoros, Buenos Aires, 1954 Oct/Dec, Vol. 4, No. 4, pp 381-394. 4 maps, 3 tables, Spanish and English summaries p 381. DAS M(05) M589v.

...The sketch of Argentine bioclimatic conditions, which utilizes a 10-year record of climatic data for 103 stations, is based upon the "Scale of Sensible Climate" which relates various scales of climatic comfort to specific values of dry bulb, wet bulb, and equivalent temperature and enthalpy of the atmosphere. Fifty localities are classified according to their bioclimatic characteristics and isotherms of climatic comfort for a very hot, cold, cool, and comfortable Argentina are constructed. (ILD)

13. Burgos, J.J. Las Heladas en la Argentina [Frost in Argentina], Colección Científica del INTA, Vol. 3, Buenos Aires 1963, 388 p. About 230 refs, 96 figs, maps, station map, 31 tables. DAS M24.37 B957ne.

...This book is a summary of many publications on frost in Argentina and its relation to agroclimatology and agrometeorology. In addition, factors of micro-meteorology, forecasting, plant resistance, and methods of frost prevention are described and illustrated. Maps of Argentina show frost-free months and no. of days, dates of beginning and ending of frost, variability of beginning and ending dates with frost expressed in days, and mean annual minimum temperature. Table 11 lists, for 261 Argentine localities, the latitude, longitude, altitude, period of record, the mean date of beginning and ending of frost, the typical deviation in days, percentage of the year with frost, and number of days without frost. Typical synoptic situations which cause frost in Argentina are mapped. (VJC)

14. Burgos, J.J. and Vidal, A.L. The Climates of the Argentine Republic According to the New Thornthwaite Classification, Annals of the Assoc. of American Geographers, Vol. XII, No. 3, 1951, pp 237-263. DAS P Col.

English

...Contains several tables and maps on the climate of Argentina. The tables include: mean possible duration of sunlight in the Southern Hemisphere; potential evapotranspiration at Buenos Aires; and the moisture balance of Buenos Aires and Rio Negro. Maps include: mean annual potential evapotranspiration; mean annual water surplus; mean annual water deficiency; moisture and thermal regions; and seasonal variation of effective moisture. (Author)

15. Cabrera, A.L. Latin America. UNESCO, "Reviews of Research - Plant Ecology", Paris 1955, (377p). Map, table, refs. DAS 581.5 U58p.

English

...Gives a brief description of climate, soils, and vegetation in Chile and Argentina. Includes an annual rainfall map of S. America of areas with less than 500 mm. (VJC)

16. Chiozza, Elena M. et al. Clima [Climate], Argentina, Suma de Geografica, Tomo II, Capitulo I, Buenos Aires, 1959. 177p, photos, maps, graphs, tables. DPU Arg F 2816.A8.

...Contains a general description of physiographical influences on Argentine climate. In the introductory part, temperature gradients on the mountain slopes (during Jul) are given for 11 mountain locations. The text contains isolated data of temperature, precipitation, pressure, and other meteorological parameters. Temperature maps include: mean annual; mean for Jan; and mean for Jul. Precipitation maps include: mean annual rainfall frequency (in days), mean annual precipitation; mean precipitation for Jan and Jun, and extreme variation of annual precipitation. Pressure maps consist of mean isobars for Jan and Jul. Other maps contain: wind roses for 18 stations; mean vapor pressure for Jan and Jul; mean annual relative humidity, mean relative humidity for Jan and Jul; mean number of cloudy days in Jan and Jul; mean distribution of thunderstorms in Jan and Jul; and potential evaporation. Summarized data (pressure, relative humidity, temperature, winds, etc.) are given for 109 stations (P.O.R. 1928-1937). (DLB)

17. Colqui, Benito S. Argentine Glaciology. American Geophysical Union, Geophysical Monograph No. 7, 1962, pp 217-228. 3 figs, 5 tables, 22 refs. DLC Q845.P2 1961.

## English

...A short history is presented of the glaciological observations made in Argentina since the time of Darwin. Four glaciers under study are described and an inventory prepared of the principal glaciers in (1) the Puna de Atacama (22°35' to 27°03'S), (2) Cordillera proper (27°45' to 44°56'S), and (3) Patagonic Ice (47°35' to 50°44'S). The possible use of meteorological satellites is discussed in connection with recording the extent and variations in glacial fields. Tiros IV satellite photographs of the north and south lobules of the Patagonic Ice are shown. (Author)

18. Czajka, Willi and Vervoort, Frederico. Die naturräumliche Gliederung Nordwest-Argentiniens [The Natural Regions of N.W. Argentina], Petermanns Geographische Mitteilungen, Vol. 100, No. 2, 1956, pp 89-102. Chart, fig, 3 photos, table. DAS P Col.

## German

...Northwest Argentina is divided into 15 orographic regions 4 of which have cross-sections showing height stages, vegetation, and ice. The influence of topography on climate is discussed, including aridity and humidity, latitude zones (north and south sub-tropics), elevated west-wind zone, and height zones of weather and glaciation. (CEPB)

19. De Fina, Armando L. et al. Calculo de las Temperaturas Medias de Localidades Montanosas Carentes de Observaciones Termometricas [Calculation of the Mean Temperatures of Mountainous Localities Lacking Temperature Observations], Instituto de Suelos y Agroecnia, Publicacion No. 66, Buenos Aires, 1960, pp 127-145. DLC S591.A75.

...Contains the calculations of the mean vertical temperature gradient for the Provinces of Jujuy and Salta. On the basis of actual data, isotherms have been drawn in regions where there are no available observations. Variation between computed values and actual readings has been determined as 1.1°C for the hottest month and 1.2°C for the coldest month. Mean annual temperatures are given for 17 Argentine stations and 2 Bolivian stations. (DLB)

20. De Fina, Armando L. et al. Difusion geografica de cultivos indices en la provincia de ... y sus causas [Geographical Distribution of Crop Indices in ... Province and Its Causes], Argentina, Instituto de Suelos y Agroecnia, Buenos Aires, Publication Nos. 50, 58, 67 (1960), 73, 80, 83, 96, 102, and 110 (1968) ... Tables, maps. DLC S591.A75 and DAS M(055) A691p.

... Tucuman Province, No. 50.

... La Pampa, No. 58.

... Jujuy and Salta Provinces, No. 67, 1960. (124 stas) This study identifies 32 agroclimatic districts within Jujuy and Salta. Temperature (means for Jul and Dec) is presented (FOR 1961-1990) Rainfall (seasonal and % frequency) is tabulated.

## 20. (cont)

... San Luis Province, No. 73, 1961. (158 stas) Precipitation data include: annual mean, seasonal, and % frequency for spring and fall. Mean temperatures are listed for Jul and Jan.

... San Juan Province, No. 80, 1962. (180 stas) Agroclimatic districts are studied on the basis of thermopluviometric data.

... Mendoza Province, No. 83, 1964. (427 stas) The climatic conditions (temp and precip) are linked to the location of 43 agroclimatic districts in Mendoza.

... Neuquen and Rio Negro Provinces, No. 96, 1965 Within these two provinces 48 agroclimatic districts have been defined. Temperature data are comprised of mean temperature of the warmest and coldest months. In addition, mean annual precipitation is included.

... Cordoba Province, No. 102, 1966. (570 stas) Temperature and precipitation values are tabulated. On the basis of these values, 21 agroclimatic districts have been defined.

... Chubut Province, No. 110, 1968. (290 stas) Mean annual rainfall and rain percentages for 6-month periods are presented. Temperature data (mean of coldest and warmest month) are also included. Forty-six agroclimatic districts have been established.

... Santa Cruz, No. 111, 1968. (459 stas) Mean temperature for Jan and Jul (1941-50) Mean annual precipitation amount; also, mean precipitation for the 3 coldest and 3 warmest months and the % of rainfall which falls in the remaining 6 months. (DLB)

21. Fantini, Antonio de Paul et al. Reconocimiento Agrohidrológico de Area de Influencia del Dique Rio Los Molinos, Zona Economica No. 9, Punto del Fian Quinquenal [Agrohydrological Exploration of the Area Affected by the Rio los Molinos Dam], Argentina, Instituto de Suelos y Agrotecnia, Pub. No. 29, 1954. 31p. 16 photos, tables, diagr. (fold), 5 refs. DAS M(055) A691p.

...The climatic data given in this study include mean monthly values of amounts of rainfall and days with rain for several stations, mean monthly values of temperature, relative humidity, vapor pressure, and of evaporation at Pilar. (Author)

22. Georgii, Walter. Contribución a la aerología de Argentina [Contribution to the Aerology of Argentina], Universidad Nacional de Cuyo, Anales Vol. 1, No. 1, 1952, pp 1-70. IPB Files.

...The first part of this study is based on aircraft and radiosonde soundings made in several short series at Buenos Aires and Cordoba in 1943-1950 and is devoted mainly to the thermal structure of the air up to 5 km. Values of temperature lapse rates and frequencies of inversion tops are given as well as mean temperatures, equivalent potential temperatures, and some wind and pressure data for specified summer and winter air masses. Part 2 is a highly detailed analysis of Zonda (Foehn) winds at Mendoza, with various tables of supporting data, including mean seasonal upper air temperatures to 7.5 km. (VJC)

23. Gimenez, Lida Raquela. El clima de verano en el Valle de Tafi [Summer Climate in the Valley of Tafi], Tucuman, Argentina. Universidad Nacional. Instituto de Estudios Geográficos, Publicaciones Especiales, Vol. 2, 1951, pp 107-118. Tables. German summary pp 117-118. DAS P Col.

...This isolated and almost arid valley lies in the mountains of Aconquija (Tucumán Province) at an elevation of 2000 m. The climatic summer lasts from Nov through Mar. Precipitation records for the period 1936-48, and temperature, humidity, cloud, and wind data for 1948-9 are analyzed and discussed briefly. Short illustrative tables of frequencies (based on one seasons records) are included. Annual rainfall amounts to 400 mm (16 in.) on the average, 70% occurring in Nov-Mar. Cloudiness, humidity and rain are at a maximum in Jan. An occasional "zonda" wind - hot dry north wind - occurs in summer. These are the strongest winds experienced in the valley. (MR)

24. Grandoso, E.N. et al. Estudio de los Campos de Flujo de Temperatura de la Capa Inferior de la Atmosfera en la Provincia de Mendoza [On the Flow and Temperature Fields of the Atmospheric, Lower Layer in the Mendoza Province], U. de Buenos Aires, *Serie Meteorología*, Vol. 1, No. 4, 1965. English Summary, Foreign Section, (ENS).

...A microneet of 26 observation stations obtained over a period of 4 consecutive seasons, 1961-64; location of area 32°30', 34°S, 68°-70°W. All stations had a recording wind vane and, in some cases, a thermohydropograph. Figure 2 shows monthly surface-wind roses at Plumerillo Airport at 2, 14, and 20 hours. Vertical cross sections at Mendoza and San Martín show that the inversions become thicker with increasing distance from the mountains, at least in the latitude of Lualunta. (Author)

25. Great Britain, Met. Office. Argentina III Meteorological Notes, Air Ministry, I.D.C.R. No. 66, London, [1953], 10p. IPB Files.

English

...Contains both descriptive and statistical summaries on the climate of Argentina. Tabular data include: percentage frequency of wind direction; average number of days with gales; seasonal mean vector wind flow; means and extremes of temperature; mean relative humidities; average number of days with fog; percentage frequency of visibility; average cloud amount (in tenths); precipitation, maximum 24-hr rainfall, number of rain days, number of hail days, and mean monthly precipitation. Includes 27 Argentine stations and one Paraguayan station (Asuncion). (DLB)

26. Eribarne, Julio V. and Grandoso, E.N. Results of the Five-Year Experiment on Hail Prevention in Mendoza (Argentina), Proceedings of the International Conference on Cloud Physics, May 24-Jun 1, 1965, Tokyo and Sapporo, [May 1965], pp 454-457. DAS M74.1 K6lp.

English

...Cloud seeding was used in an effort to suppress hail incidence. The Mendoza area was used for this study from November to March. A statistical analysis shows both the level of significance and the percentage of seeding effect. Recorded phenomena (hail and thunderstorms) are also tabulated. (DLB)

27. Koeppe, Clarence E. and De Long, George C. Weather and Climate. N.Y., McGraw-Hill Book Co., 1958. 341p, numerous figs. (incl. photos), foot-ref bibliog. pp 303-307. DLC QC863.K714, DAS M K78wea.

English

...Contains tabular summaries for an unspecified period of record of monthly and annual mean temperature and mean precipitation for Copiapo, Evangelistas Islands, Santiago, and Valdivia, Chile; Buenos Aires and Ushuaia, Argentina. In addition, world maps show the annual, Nov-Apr, May-Oct precipitation; rainfall variability; mean temperature for Jan and Jul, the surface pressure; the prevailing winds and the annual surface pressure. (VJC)

28. Kreiner, R. Descripción Hidrogeológica de la zona de Firmat-Casilda y Canada de Gomez Provincia de Santa Fe [Hydrogeologic Description of the Zone of Firmat-Casilda y Canada de Gomez of Santa Fe Province], Ministerio de Economía y Trabajo, Boletín No. 117, Buenos Aires, 1969. 36 + pages. 7 tables, 23 refs, fig. TOPOCOM QE 231 A68 No. 117.

...A climatic description and explanation of the methods used are given under the section on climatology. A map is given of this small region on page 7. Climatological data for Casilda are presented in tables and graphs; also, some data for Carcarana, Firmat, and Fuentes. A map shows the annual isohyets based on the period 1925-50. Extensive hydrogeologic data are provided. (VJC)

29. Lamb, H.H. The Southern Westerlies: A Preliminary Survey; Main Characteristics and Apparent Associations. Quat. Jnl. Royal Met. Soc., Jan 1959, pp 1-23. 63 refs, 14 figs, 1 table. DAS M(055) R888q.

English

...The author describes the seasonal circulation of the southern hemisphere (south of 20°S), illustrated by cross-sections and maps. Fig 2 shows the annual 500-mb height in dekameters based on Dec 1951-Nov 1954 data. Fig 6 & 7 depict the summer and winter 500-mb heights in dkm. Figs 8 & 9 show the mean 1000-500 mb thickness (m) for summer and winter. Figs 11 & 12 outline the distribution of anticyclones for summer and winter. This article and bibliography are a good summary of the state of knowledge up to 1958. (VJC)

30. Lichtenstein, E.R. and Schwarzkopf, M.L. Squall-lines in Argentina. "Weather", London, Vol. 21, No. 5, May 1966, pp 181-186. Figs. DAS M(05) R888w.

English

...The author discusses typical observations during a squall-line passage, the general squall-line characteristics, frequency of occurrence, and specific details of a squall-line of 2 Jan 65. Synoptic charts of squall-line occurrences are given and an isoline chart showing frequency of squall-lines in Argentina over a 10-yr period. (VJC)

31. Marchetti, Adolfo A. Estudio del Régimen Pluviométrico de la República Argentina [A Study of the Rainfall Regime of Argentina], Meteoros, Buenos Aires, Vol. 2, Nos. 3/4, Jul/Dec 1952, pp 243-309, 15 figs, 17 tables. English Summary p 243. DAS M(05) A691a.

...A statistical study of precipitation is presented based on the period 1905 to 1946 using 67 stations. Annual and monthly precipitation amount, frequency and intensity, extreme values, mean daily maximum amounts, and duration and frequency of wet and dry spells are tabulated. Frequencies of rainy periods are given for Buenos Aires. Graphs, isohyetal and frequency charts, and statistical calculations are included. (VJC)

See also:

-----Frecuencia de las Lluvias intensas de Corta Duracion en la Ciudad de Buenos Aires [Frequency of Intense Rains of Short Duration in Buenos Aires], Meteoros Vol. 2, Nos. 1/2, Jan/Jun 1952, pp 7-24, 3 figs, 9 tables. English Summary p 7. DAS M(05) A691a.

See also:

-----Probabilidad de la Lluvias Intensas en la Ciudad de Buenos Aires [Probability of Heavy Rains in Buenos Aires], Meteoros, Buenos Aires, Vol. 3(2/3), 1953, pp 131-134. 2 figs.

32. Mochado, Emilio A.M. and Marchetti, Adolfo A. Régimen de días de lluvia en la República Argentina [Regime of Days of Rain in Argentina], Meteoros, Buenos Aires, Vol. 5, No. 4, Oct/Dec 1955, pp 243-276. 33 figs, 12 tables, 2 refs, numerous eqs. Spanish and English summaries p 243. DAS M(05) M589w.

...Forty-five years of rainfall data for the stations of Posadas, Tucuman, La Rioja, Córdoba, Buenos Aires, and Trelew are analyzed statistically using the probability concepts of BERNOULLI, LEXIS, and POLYA. The various statistical coefficients are computed and are presented in graphs and tables. Tables giving the number of days of rain in each month and year for each station are presented. (ILD)

33. Morris, Arthur S. The Development of the Irrigation Economy of Mendoza, Argentina, Annals of the Assoc. of American Geographers, Vol. 59, No. 1, Mar 1969, pp 97-115. DAS P Col.

English

...Contains isoline maps of mean dates of the first autumn frost and last spring frost. A general description of the climate and soils of the Mendoza region is presented. (DLB)

34. Pastore, Lorenzo Dagnino. Atlas Adjustado al Texto de Geografía [Adapted Atlas and Geographic Text], Para V Año, Talleres Grafico, Buenos Aires, 1960, 4 maps. DPU Ref. HC 173.D3.

...A hydrographic map of Argentine locations, rivers, and basins is shown relating them to vegetation; also included is a climatic classification map. (DLB)



35. Prohaska, Federico J. Algunos aspectos del clima de la Alta Cordillera de la Puna Argentina [Some Aspects of the Climate of the High Cordillera and the Argentine Puna], Argentina. Instituto Nacional de Tecnología Agropecuaria. Publication No. 79, Reprint from the Boletín de Estudios Geográficos No. 30 - Vol. VIII. Jan-Mar 1961. Universidad Nacional de Cuyo. pp 21-30. Buenos Aires, 1962. Foreign Area Section, (EDS).
- ...Presents a discussion of the climate of the mountain regions. Graphs show: Fig 1: Annual variation of the relative frequency of wind directions at La Poma (Salta), altitude 3000 m., and Santa María (Catamarca), altitude 1900 meters. Fig 2: Monthly maximum, mean and minimum temperatures at Quiaca (Jujuy), altitude 3460 meters. (HKG)
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36. Prohaska, Federico J. (Inst. de Suelos y Agrotecnia del INTA), El problema de las sequias en la región semiárida pampeana y la sequia actual [Problem of Droughts in the Semiarid Pampas and the Present Drought], "Idia", Buenos Aires, No. 155, Nov 1960, pp 53-67. 8 figs, 2 fold, 2 tables. Reprinted as Argentina, Instituto de Suelos y Agrotecnia, Publicacion, No. 71, 1961. .  
DLC S591.A75.
- ...The annual totals of precipitation in Argentina show a gradual diminution from E-W, interrupted only by orographic rains E of the Pampas Mountains and foothills. The semiarid Pampas region is bounded on the east by isohyets of 700-800 mm and on the west by isohyets of approximately 500-600 mm, according to latitude. This zone extends from the center of Córdoba up to Bahra Blanca, embracing a region of 220,000 square Km. The spatial and temporal regime of precipitation, annual total potential evapotranspiration, and of water deficit and the rainfall deficits in the months of Apr and May 1960, etc. are described with the aid of data presented in tables and graphs. There is an annual drought of 3-4 months which sometimes may extend to 7-8 months. In general, the months from May-Sep bring only 5-10% of the total annual rainfall. (ILD)
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37. Prohaska, Federico J. Las Características de las Precipitaciones en la Region Semiarida Pampeana [The Precipitation Characteristics of the Semi-arid Pampean Region], Revista de Investigaciones Agrícolas, Instituto de Suelos y Agrotecnia, Publicacion no. 72, Buenos Aires, 1961, pp 199-232. DLC S591.A75.
- ...The characteristics of precipitation in the semi-arid region of central Argentina are analysed. Results are based on 55 years of daily observations and 5 years of recording gauges at Victorica, La Pampa. Data are given for intense rainstorms at Victorica. Times are given (in hours and minutes) for duration, beginning, and ending of heavy rainstorms. Frontal passage times are linked to these rainstorms. The storms examined were from the 1954-1957 period. Other precipitation data include rainfall distribution, average deviation, standard deviation, and the coefficient of variability. Also, annual and monthly total of rainfall of Victorica is given (POR 1905-1959). (DLB)
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38. Prohaska, Federico J. Regimenes estacionales de precipitacion de Sudamerica y Mares Vecinos [Seasonal Regime of Precipitation of South America and Nearby Seas], "Meteoros", Vol. 2(1/2), Jan-Jul 1952, pp 66-100. Tables, graphs, map. DAS M(05) A691a.

...Tabular summary (1913-37) lists dry and wet periods for 10 stations showing mean no. of days, amount in mm, and % of annual. A map of NE Argentina and adjacent areas indicates regions of monthly or seasonal maximum and minimum precipitation with order of magnitude. Graphs depict the month-to-month pressure gradient (mm/100 km) between 6 pairs of stations located from NW Argentina to the Atlantic coast. Tables show monthly and annual pressure - mean, annual range, for Santiago del Estero and Buenos Aires (1911-40). (VJC)

39. Prohaska, Fritz. Über die meteorologischen Stationen der hohen Cordillere Argentinens [Meteorological Stations in the High Cordillera of Argentina], Sonnbliss-Verein, Vienna, Jahresbericht, Vol. 51/53, 1903-1955, 1957, pp 45-55. Fig, 3 tables, 3 refs. DAS M(06) 8699.

German

...A list of all stations in Argentina situated above 3000 meters MSL, including their geographical coordinates and period of record, is given. The locations of the high altitude stations which are situated in the provinces of Jujuy, Salta, La Rioja, and Mendoza are described in detail. The climate of the Argentine Cordillera consists of two principal types: a type dominated by the planetary west wind and that dominated by advective, humid, warm air masses from southern Brazil in summer and by its position in the subtropical anticyclone in winter. The climates of the stations in these two climatic zones are described with the aid of numerical data giving mean monthly values of the meteorological elements for representative stations in these zones (Cristo Redentor and La Quiaca) and graphs of the annual variations of wind direction frequencies at La Poma (Salta) and Santa Maria (Catamarca). (ILD)

40. Rabsiun, Simon. Introducción a la hidrologia de Tucumán [Introduction to the Hydrology of Tucuman], San Miguel de Tucumán, Universidad Nacional de Tucuman, Facultad de Ciencias Exactas y Tecnologia, 1960, 179p. 39 photos, 3 maps (2 fold), 23 geological profiles, 17 tables, 13 refs. DAS (M79 R1161a).

...An isohyetal map and a contour map of the province are given. Climatic data are discussed and presented in tables of temperature, wind, relative humidity, and precipitation. Hydrographic data and geologic sections are presented for various parts of the province. (Pt. DBK)

41. Röhncke, G. Thunderstorm Activity in the Andes of Northern Argentina. J.A.M. Vol. 4, Apr 1965, pp 186-189. 6 refs, table. DAS M(05) J8610a.

English

...A thunderstorm center, not generally well-known and not pointed out in the WMO maps of global thunderstorm activity, in the Andes of northern Argentina is described. The relationship of its activity to meteorological and orographic conditions is discussed. This center is supposed to have a strong effect on the atmospheric electric global circuit. (Author)

42. Rousseau, Carlos A. El uso del agua subterránea como solución para algunos problemas de irrigación en las zonas del Centro y Oeste de la República Argentina [Use of Underground Water as a Solution for Some Problems of Irrigation in the Central and West Zones of Argentina], San Rafael, Mendoza. Commission Municipal de Cultura, Cuaderno, No. 1, Jul 1956, 14 p. 13 refs.

...It is explained that some of the hydrogeological conditions in the western part of the country resemble conditions in North America. The need for irrigation is pointed out. A 10-point program is offered for the solution of the water shortage problem. Conservation of ground water is recommended. A brief description of meteorological conditions in the western part of Argentina is included. (EVS)

43. Schwerdtfeger, W. and Prohaska, F. Análisis de la marcha anual de la presión y sus relaciones con la circulación atmosférica en Sudamérica austral y la Antártica [Analysis of the Annual Variation of Pressure and Its Relation to the Atmospheric Circulation in Southern South America and the Antarctic], Meteoros, Buenos Aires, Vol. 5, No. 4, Oct/Dec 1955, pp 223-237. 12 figs, table, 7 refs. Spanish and English summaries p 223. DAS M(05) M589w.

...With the aid of charts the author describes the unusual variation of the mean annual barometric pressure in the southern part of South America and in the Antarctic where, as in Tierra del Fuego, the maximum and minimum occur during the same period, Oct and Nov, respectively. The mean annual and semiannual pressures are subjected to harmonic analysis and their variation with altitude is considered. The annual oscillation of pressure has an inverse relationship to the temperature at the earth's surface. The semiannual pressure oscillation is caused by the unequal heating of the upper troposphere and is also influenced by zonal currents and by conditions in the Antarctic and middle latitudes. (ILD)

44. Schwerdtfeger, Werner. Análisis sinóptico y aspecto climatológico de dos distintos tipos de depresiones baricas en el norte de la Argentina [Synoptic Analysis and Climatological Aspect of the Distinct Types of Baric Depressions in Northern Argentina], Meteoros, Buenos Aires, Vol. 4, No. 4, Oct/Dec 1954, pp 301-323. 9 figs, 7 tables, 10 refs, eq. Spanish and English summaries p 301. DAS M(05) M589co.

...The author analyzes a characteristic example of each of two types of cyclones found over northern Argentina. The first type is a cyclone whose formation is associated with the existence of a pronounced upper-air trough and the presence of humid, tropical air masses in the lower layers over the northeastern provinces. Extensive precipitation results from the intensification of these pressure systems. The other type is the "thermal low" characteristic of the summer pressure pattern of northwest Argentina. These depressions, as a result of the high mean temperatures (also mean vertical temperatures) which exceed considerably those of south Brazilian stations studied at the same altitude, are shallow and disappear at the 3000-meter level; but because of their semipersistence, they have considerable repercussions on the wind regime in the lower layer of adjacent zones and on the formation of summer rainfall in the northeast. (Author)

45. Schwerdtfeger, W. Determinación indirecta de las condiciones climáticas del hielo continental Patagónico [Indirect Determination of Climatic Conditions of the Continental Ice of Patagonia], Natl. Met. Service, Argentina. Sociedad Científica Argentina, Anales, Vol. 161 (4/6), Apr/Jun 1966, pp 53-82. 4 figs, 8 tables, 17 refs. English summary p 53. DLO Q33.A6.

...The scanty meteorological data for the vicinity of the Chilean (Patagonian) ice fields are analyzed and extrapolated to show the physics of the conditions which prevail in these ice fields. Winds over the Cordillera during each of the 4 seasons at 45-50° and 50-55°S, a model of air currents to 10 km over the Cordillera, humidity, cloudiness, condensation level, temperature frequency at the foot of the mountain and on the continental ice, difference between mean monthly temperature at the base and top of the range and in the free air, precipitation at 14 points (up to 5000 mm/yr) and seasonal regime, vertical movements of air and thermodynamic consequences, etc., are discussed with tabular and graphic analyses of data. It is estimated that annual precipitation over the ice fields should be 7000 mm or 275". (MR)

46. Schwerdtfeger, W. Ein Beitrag zur Kenntnis des Klimas im Gebiet der Patagonischen Eisfelder [Climate of the Region of Patagonian Ice Fields], Zeitschrift für Gletscherkunde und Glazialgeologie, Innsbruck, Vol. 4 (1/2) 1958, pp 73-86. Fig, 3 tables, 18 refs. English summary pp 75-86. DAS P Col.

German

...As there are no meteorological stations in the region of the great ice masses of the southern Cordillera, the characteristics of their climate can be determined only by inductive methods, extrapolation of values observed at the coast of southern Chile, comparison with the conditions of mountains in other parts of the world likewise exposed to strong and permanent currents of maritime air masses. The mean monthly values of temperature at the 2000-meter level (Table II) prove remarkably lower than those of the free atmosphere. The average precipitation over the ice masses and their western slopes, estimated by 4 different methods, have the magnitude of 7000 mm (275 in.) per year. (Author)

47. Schwerdtfeger, Werner. El balance de agua en una zona sin desagüe superficial [Water Balance in a Zone without Surface Runoff], Idia, Buenos Aires, No. 149, May 1960, 9p. 2 figs, 4 tables. Spanish and English summaries p 9. DNAL 9 I D3.

...The paper deals with the water balance in central Argentina, where some 120 "lagunas" (lakes without outlets) exist. An analysis of the level of one of these "lagunas" and of related data is used to determine annual (182 cm) and monthly evaporation and the ground-water flow which accounts for the "lagunas." The report includes: a table of monthly temperatures (mean maximum and minimum); relative humidities; vapor pressures and cloudiness at Mercedes (33.7°S, 65.5°W, elev. 515 m), and at Union (35.1°S, 65.9°W, elev. 372 m), for 1941-1950; a histogram of annual precipitation at the "Don Roberto" station (34.0°S, 63.5°W, elev. 430 m) for 1903-1958; a graph of the mean monthly water levels in Laguna Talca and of corresponding precipitation at three nearby stations for Dec 1953-58; a table of precipitation at "Don Roberto" and of levels of Laguna Talca. Included also is a table of measured and calculated monthly evaporation for the A pan and with Albrechts formula at Mercedes, for Laguna Talca (measured and precipitation minus water level changes). (DBK)

48. Schwerdtfeger, Werner, and Vasino, Cesar J. La variación secular de la continentalidad en la Republica Argentina [Secular Variation of the Continentality of Argentina] *Meteoros.*, Buenos Aires, Vol. 5, No. 3, Jul/Sep 1955, pp 177-184. 3 figs, 2 tables, 3 refs, 3 eqs. Spanish and English summaries p 177. DAS M(05) M589w.

...An analysis of 50 years of temperature records of 59 Argentine stations shows an increase of continentality in the western and a diminution in the northeastern region of the country. The phenomenon is related to a slight variation of some characteristics of the general circulation over the extra-tropical latitudes of South America; a variation which also affects the regime of rainfall, frequency of wind directions, interdiurnal variability of pressure, and other elements. (Author)

49. Schwerdtfeger, W. Mas lluvias al fin de la semana. Realidad o ilusion? [More Rain over Weekends; Reality or Illusion?], *Ciencia e Investigacion*, Buenos Aires, Vol. 10, No. 3, Mar 1954, pp 119-122. Fig, table, refs. DLC Q4.C48.

...The total number of rainy days over 156 weeks listed for each day of the week (Buenos Aires, 1948-1952), showing that there is no marked accumulation of rainfall frequency on any day of the week. However, during a 16-week period (Feb-May 1950) 91% of the total rainfall fell between 8 p.m. Friday and 8 p.m. Monday. A succession of rainy days on the same day of the week frequently occurs in Argentina during a period of a few weeks. This may be attributed to a 7-day periodicity of rainfall. (GT)

50. Shishkin, N.S. Meteorologicheskije issledovaniia v Argentine [Meteorological Investigations in Argentina], *Meteorologia i Gidrologia*, Moscow, No. 6, Jun 1967, pp 110-114. Figs, refs. DAS M(05) M589.

Russian

...The author spent two months in 1962 giving a series of lectures in Argentina. In this report he describes what he discovered regarding the Argentine Met. Service during that time. Brief statistics are given of the number of stations of different types maintained. A visit was made to a radiosonde station and an observing station. Details of the instrumentation at each are given. Procedures at the main weather forecasting office are described. The main center of meteorological research is the Inst. of Atmospheric Physics at the Univ. of Buenos Aires. Work is in progress on cloud seeding, hail control, and cloud physics. Training of meteorologists is also carried out at the Univ. of Buenos Aires. (RB)

51. Volkart, Conrado M. Especies de Pinos de buenas posibilidades para la Provincia Argentina de Misiones [Good Possibilities for a Species of Pine in the Misiones Province of Argentina], *Turrialba, Revista Interamericana de Ciencias Agricolas*, Costa Rica, Vol. 14, No. 1, Jan/Mar 1964, pp 29-37. DNAL 241 IN828.

...The ecological conditions of the Misiones Province in northern Argentina are discussed as to climatic and soil factors, including a classification of climatic zones and soil types. Fig 1 is a map showing the climatic zones of the area in the study. (Pt. Author Abst)

52. Walter, Heinrich. Das Pampaproblem in vergleichend ökologischer Betrachtung und seine Lösung [Problems of the Pampa in Comparative Ecological Observation and Its Solution], *Erdkunde*, Bonn. Vol. 21, No. 3, Aug 1967, pp 181-203. Figs, tables, refs. English summary p 181. DAS P Col.

German

...The problem of the origin and the nature of the vegetation of the pampas is examined with particular reference to the prevailing moisture regime. Various considerations based upon an examination of temperature and the rainfall regime of individual localities on the Argentine pampa and computation of evapotranspiration by the Thornthwaite and Papadakis procedures indicate that the pampa region, at least its eastern portion, is humid. Actual measurements of potential evaporation for the province of Buenos Aires show that, with the possible exception of the La Plata shore zone, the water balance in the entire pampa is negative. The pampa has a climate similar to a weak semi-arid type in which aridity increases from NE to SW as in the case of the forest steppe of East Europe. The boundary line between grassland and forest is not determined directly by climate or soil but by the competitive ability of grassland types on the one hand and tree types on the other. (ILD)

53. Weber, Teodoro F.A. Reconocimiento Agroclimático del Valle del Río Colorado [Agroclimatic Survey of the Colorado River Valley], Instituto de Suelos y Agrotecnia, Publicacion No. 69, 1960, pp 33-40. Map. DLC S591.A75.

...Tables contain annual mean minimum and maximum temperature and mean annual evaporation. Annual January, and July means are given for pressure, temperature (max, min, absolute max and min), vapor pressure, relative humidity, cloudiness, wind speed, and precipitation. Observations (POR 1941-1950) were taken at S39°01', W64°01'. (DLB)

54. Wolcken, Kurt. Algunos aspectos sinopticos de la lluvia en la Argentina [Some Synoptic Aspects of Rain in Argentina], *Meteoros*, Buenos Aires, Vol. 4, No. 4, Oct/Dec 1954, pp 327-366. Maps, 10 tables, 14 refs. Spanish and English summaries p 327. DAS M(05) A691m.

Also issued as Argentina. Servicio Meteorologico Nacional, Serie Meteorologica, Publicacion No. 28, 1954-

...This study begins with a description of the precipitation, water vapor, and mean temperature and pressure distribution over South America; the Jan and Jul and annual distribution of these elements being illustrated by means of isolines. This is followed by a synoptic analysis of the precipitation of Argentina in 1941 and 1942 for Tucumán, Corrientes, Mendoza, Buenos Aires, and Santa Rosa (Patagonia being excluded). Tables show quantitatively the role of each of those processes in the formation of rainfall. Also, maximum daily rainfall for these areas and the ten extreme cases for each place are analyzed synoptically. (ILD)

# Chile

## (1951-1969)

55. Almeyda Arroyo, Elias and Fernando Saez Solar. Recopilación de datos climáticos de Chile y mapas sinópticos respectivos [Summary of Climatic Data of Chile and Corresponding Climatic Maps], Chile. Direccion General de Produccion Agraria y Pesquera. 195p. Santiago de Chile, 1958. DAS M82.3/83. C537re.
- ...Contains tabular summaries of: seasonal and annual mean precipitation for 556 stations for 2-90 years; mean number of months and total number of years considered as drought periods and percentage of total number of years with drought periods of 9-11 months for 302 stations for 4-35 years; mean temperature for Jan, Jul, and annual for 73 stations for 2-45 years; mean max temperature for Jan for 73 stations for 2-45 years. Also, included are isoline charts as follows: precipitation (for seasons and years), temperature (mean Jan and Jul, mean maximum in Jan), cloudiness (mean annual), dry months, and mean relative humidity (at 1 or 2 PM in Jan, and mean for spring season). (VJC)
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56. Chile. Oficina Meteorologica. Publicación Mensual Oficial No. 13, 14 [Monthly Official Publication No. 13, 14], Ministerio de Defensa Nacional, Fuerza Aerea de Chile, Direccion de Aeronautica, Santiago, Chile, 1967, 29p. Tables, articles. DAS M(05) C537pu.
- ...These publications have brief articles on meteorology and a synopsis of the weather for the month. In addition, they contain monthly temperature, precipitation, and relative humidity for about 60 stations. The daily precipitation amount for many stations is also listed for June and July 1967. No. 13 has part of an article on plans for the period 1968-1971 by the WMO. (VJC)
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57. Chile, Oficina Meteorologica. Pluviometria de Chile [Precipitation of Chile], Fasc. II 1965; Fasc. II, parte II, 1966; Fasc. II, parte III, 1967, Santiago. 268 p., 170 p. Station lists, monthly tables. DAS M06.3/83C536plu, 1966, 1967.
- ...These three volumes have brief explanatory notes about the tables. Fasc. II contains the monthly and yearly precipitation for 137 stations and the computed values of the 1931-60 normals, when appropriate. The seasonal normals are tabulated and the yearly values graphed. Fasc. II Pt II lists (for 82 stations) the monthly and annual precipitation: normal (1931-60); the number of months precipitation was normal, above, below, and no precipitation; maximum positive and negative deviation and range; probable error, coefficient of variation, maximum in 24 hrs, and no. of days with .1, 1.0, 10 mm or more and the percentage value. Pluviograms show the

## 57. (cont)

monthly and annual absolute maximum in 24, 12, 6, 5, 4, 3, 2, and 1 hour and 30, 10, 5, and 1 minutes with dates for Santiago (1917-50), Easter Island (1957-62), Pánu de Vía (1940-60), and Aisen (1958-61). Fasc. II Pt. III lists the monthly and annual precipitation amount, year-by-year, and the average over the period of record for an additional 349 stations. (VJC)

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58. Chile. Oficina Meteorológica. Anuario Aerológico 1963-64 [Aerological Annual 1963-64], Santiago. [1965] Santiago. Tables. DAS MOA.7/83 C537an 1963, 1964.

...Twice daily radiosonde data are tabulated for Antofagasta, Quintero, and Puerto Montt from the surface every 50 mb to 200 mb plus 175, 150, 125, 100, 80, 70, 60, 50, 40, 30, 25, 20, 15, and 10 mb. The elements shown are height, temperature, relative humidity, wind direction, and speed. (VJC)

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59. Chile, Servicio Met. Anuario Meteorológico de Chile [Meteorological Annual of Chile], Sección Climatología 1869-1946, 1956 ... (1968), Santiago, 1969. Mostly tables. DAS MOA.1/83 C537a.

...The number of stations varies up to 403. Tabular monthly and annual summaries (year-by-year) are given for: mean temperature at 08, 14, and 19 LT, mean, mean max, mean min, and extreme temperatures; mean relative humidity at 08, 14, and 19; total number of sunshine hours; mean station and sea-level pressure; mean wind direction and speed at 3, 14, and 19; max wind speed and direction; frequency of wind direction (8 points and calm) and mean speed; mean cloudiness (0-8) at 08, 14, and 19, total evaporation; total precipitation and max in 24 hours; number of days with: min temperature  $\leq 0^{\circ}\text{C}$  and  $\geq 20^{\circ}\text{C}$ , max temperature  $\geq 25^{\circ}\text{C}$ , wind speed  $> 20$  and  $> 30$  knots, cloud amount  $\geq 6/8$  and  $2/8$ , precipitation  $\geq 0.1$ ,  $\geq 1.0$  and  $\geq 10.0$  mm, rainfall, snow, hail, storm, fog, frost, ground covered by snow, and dew. The times in 1968 are 08, 14, and 20 LT. (VJC)

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60. Chile, Instituto Geográfico Militar. Atlas de la República de Chile [Atlas of the Republic of Chile], Ministerio de Defensa Nacional, Santiago, 1966, 121p. DPU Ref Chi G 1750. C5.

...Three climatic maps of Chile illustrate, by region, the 14 climatic types occurring in Chile. Temperature - climogram inserts on the above maps (annual temperature curve) are provided for La Serena, Potrerillos, Isla de Pascua, Conchones, Iquique, Temuco, Santiago, Puerto Aisen, and Evangelistas. (DLB)

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61. Chile, Departamento de Navegación e Hidrografía de la Armada, Derrotero de la Costa de Chile Vol. I Desde Arica hasta el Canal Chacao [Navigation tracks of the Chilean Coast, Vol. I from Arica to the Chacao Canal], 4th Ed., Valparaíso, 1961, 753 p. DLC VK967.C45.

...Contains summarized (POR 1911-1950) climatological data for Arica, Antofagasta, Coquimbo, Valparaíso, Juan Fernandez, Talcahuano, Valdivia, and Canal Chacao. The data include: temperature, mean monthly, mean maximum, mean minimum, extreme maximum and extreme minimum; relative humidity; rainfall, mean monthly, maximum in 24 hours (and the year of occurrence), and days per month with rain; mean monthly cloudiness; and maximum wind speed. (DLB)

62. Chile, Corporación de Fomento de la Producción, Geografía Económica de Chile [Economic Geography of Chile], Fundación - Pedro Aguirre Cerda, Tomo I, Santiago, 1950, p 428. DPU Ref Chi HC 192.F96.

...Contains an extensive section on the climate of Chile. Several maps are given on rainfall distribution and annual precipitation for Chile. Other maps give average annual temperature (by isotherms) for various regions. Additional charts and graphs give cloud cover and humidity. (DLB)

63. Chile, Oficina Meteorológica, Endesa y Ministerio de Obras Públicas [Dirección de Riego], Climatología de Chile, valores normales de 36 estaciones seleccionadas - período 1916-1945 [Climatology of Chile, Normal Values for 36 Selected Stations - Period 1916-1945]. Santiago de Chile, Mar 1964, Office of Climatology, Foreign Section Files. DAS M82.1/83 G536c1.

...Contains for 36 stations tabular monthly and annual summaries within the period 1916-1945 of: mean pressure; mean temperature at 07, 13, and 18; mean max and min temperatures; mean daily temperature; extreme temperatures; mean relative humidity at 07, 13, and 18; mean cloudiness (tenths) at 07, 13, and 18; mean precipitation; max precipitation in 24 hours; wind direction frequency (8 points and calm); mean number of days with: precipitation  $> 0.1$  mm., snow, hail, thunderstorm, fog, clear ( $\leq 2.0$ ) and cloudy ( $> 8.0$ ) skies, wind  $> 6$  and  $\geq 8$  Beaufort scale, minimum temperature  $> 20^{\circ}\text{C}$ , max temperature  $> 25^{\circ}\text{C}$ . (VJC)

64. Chile, Sociedad Chilena de Historia y Geografía, Geografía De Chile; Física, Humana y Económica [Geography of Chile; Physical, Human, and Economical], Empresa Editora Zig-Zag Santiago de Chile, 1968. 280p. 53 figs, 47 tables. U.S. Army TOPOCOM GB 156 S67.

...Part 7 (pages 42-100) of the physical characteristics of the territory contains a discussion of the varieties of climate in Chile. Fig 4 illustrates these various climatic types and shows annual isotherms. Fig 7 shows climograms of temperature and precipitation by month for Iquique, Canchones, Antofagasta, Atacama, and Copiapo. Figs 11, 14, and 18 have the same type climograms for Valparaíso, Los Andes, Santiago, Curico, Concepcion, Temuco, Valdivia, Puerto Montt, Aysen, San Pedro, Evangelistas Isle, Punta Arenas, and Balmaceda. P.O.R.'s unknown. (ALS)

65. Dingman, Robert J. and Galli O, Carlos. Geology and Ground-Water Resources of the Pica Area, Tarapaca Province, Chile. U.S. Geological Survey Bulletin 1139, 1955. Figs, tables, refs. DLC QE75.B9.

English

...Reports the first of a series of systematic investigations of the geology and ground-water resources of Chile. The purpose was either to direct the ground-water exploration into more promising localities in the area or to determine that the area was unpromising so that the exploration could be terminated. Information is given on relief and drainage, on climate and culture, and ground-water resources. The water quality studies found the ground water suitable for irrigation. (ES)

66. Follmann, Gernard. Nordchilenische Nebeloasen (North Chilean Fog Cases), Umschau, Frankfurt a.M., Vol. 63, No. 4, 15 Feb 1963, pp 101-104. 6 figs, refs. DAS P Ccl.

German

...Certain geomorphologically-favored mountains in the North Chile desert regularly receive fog moisture brought in by winds blowing landward from the cold-water region of the seacoast. The author describes the fog vegetation and the plant associations and presents some data on moisture measurements obtained in the Pray Jorge fog oasis. Annual precipitation amounts of 1500 mm, condensed under trees, have been recorded, while the actual precipitation amounted to less than a tenth of this figure. The amount of moisture brought in by the prevailing southwest wind, which may transport some 50 km of "fog air" past a point in 5 to 10 hrs, does not explain fully this large amount of moisture. As a result of fall in pressure with altitude, the moisture condenses and is precipitated along the slopes. (MLD)

67. Frick, G. and Desvignes, F. Measures solarimétriques effectués dans le nord du Chili Septembre 1957-Septembre 1958 [Solar Radiation Measurements in Northern Chile, Sep 1957-Sep 1958], Acta Electronica, Paris, Vol. 3, No. 2, Apr 1958, pp 155-166. Figs, 3 tables, 4 photos, French summary p 155. English summary p 191. DLC TJ7800.A35.

French

...A description of solarimetric instruments and recordings are presented. Because of very light clouds in the investigated region and by means of certain hypotheses whose choice is justified, this method can be rendered particularly simple. A comparison between the theoretical and experimental values of daily and seasonal variations of the observations are processed on a horizontal level. The results derived from observations show that for two stations located 50 km from the ocean, one of them at the Tropic of Capricorn and the other 200 km farther southward, the annual energy received is o/a 2600 KWH/sq m. A loss below 3% has to be deducted from this quantity due to the slight haze. (Author)

68. Gierloff-Eden, Hans-Gunter. Der Humboldtstrom und die pazifischen Landschaften seines Wirkungsbereiches [The Humboldt Current and the Pacific Regions in Its Sphere of Influence], Petermanns Geographische Mitteilungen, Rother, 103(1):1959, pp 1-17. 11 figs, 4 plates in pocket. 118 refs. Spanish and German resumes pp 1-2. DAS P Col.

German

...This comprehensive study of the Humboldt current is based upon an extensive review of the literature and includes a detailed discussion of the following: history of the discovery and naming of the current, its origin, course, and oceanographic characteristics, including temperature, distribution, disturbances, biological and geographical effects of the Humboldt current, the geographic boundary of the Pacific coastal landscape influenced by the current, a description of the coast, rivers, climate, vegetation, and dunes; and the extent of the influence of the current in the interior of Chile and upon the Galapagos Islands. (HED)

69. Great Britain, Met. Office. Chile III Meteorological Notes, Air Ministry, I.D.C.R. No. 80, London, May 1964, 20 p. IFB Files.

English

...Contains summarized climatological data for 24 stations. The data include: percentage frequencies of wind direction, visibility, and cloud base (below 600 and 1000 ft); mean absolute temperatures; sea-surface temperature; mean relative humidity; cloudiness and cloud amount; precipitation, mean monthly precipitation, average number of days with rainfall, 24-hour maximum rainfall; and average number of days with snow. A general description of climate is also given. (DLB)

70. Holdgate, M.W. Man and Environment in the South Chilean Islands. "Geographical J," London, 127(4):Dec 1961. pp 401-416. 4 figs, 5 photos, 26 refs. DAS P Col.

English

...This geographical paper deals with the conditions and natural resources of the area and the way in which the human inhabitants have become adapted to the islands. The environment of the western mountains and the eastern plains are discussed. The climatic gradient across South America between 95° and 50°S, the location of stations in relation to a diagrammatic section of the continent and their rainfall, and the difference between Jan and Jul mean temperatures are depicted on a graph. Distribution of vegetation and the adaptation of the Indian tribes to the climate are discussed. (VJC)

71. Klapp, Ernst. Futterbau und Futterwirtschaft in Chile zwischen dem 30. und 42.° s. Br [Cultivation and Economy of Forage Crops in Chile between 30 and 42°S Latitude], Bonner Geographische Abhandlungen, Bonn, No. 17: 1956. pp 87-137. Tables, 28 refs. Spanish summary pp 187-188. DLC G58.B6.

German

...A general description of the climate of Chile is given and its effect upon vegetation. This is followed by a more detailed study of the relationship of climate to fodder crop production in the subtropical dwarf-shrub

## 71. (cont)

steppe and of the cactus steppe of the "small North". Climatic descriptions are given of the following regions: the hinterland of Coquimbo-La Serena, Aconcagua to Rio Mante, the transition zone of the Laja heath, and Frontera Osorno-Llanquihue, and the Cordillera piedmont. (ILD)

72. Kummerow, Joschen. Quantitative Messungen des Nebelniederschlags im Walde von Fray-Jorge an der Nordchilenischen Kuste [Quantitative Measurements of Fog Precipitation in the Fray-Jorge Forest on the North Chilean Coast], Naturwissenschaften, Berlin, Vol. 49, No. 9, May 1, 1962, pp 203-204. Fig, table, 5 refs. DAS P Col.

German

...The precipitation regime of the Fray-Jorge forest is described briefly and the results of measurements of fog precipitation carried out with the Grunaw fog capter are presented in a table and analyzed. Since fogs occur throughout the year, the annual fog precipitation is actually around 1700 mm as compared with the mean annual recorded precipitation of 150 mm. The forest has the characteristics of a rain forest requiring an annual precipitation of 1700 to 2000 mm. (ILD)

73. Kunkel, Gunther. Meteorologisch-mikroklimatologische Beobachtungen in Valdivia (Sudchile) [Meteorological Microclimatological Observations in Valdivia, South Chile], Akademie der Wissenschaften, Berlin. Klasse fur Chemie, Geologie und Biologie, Abhandlungen, No. 5, 1959, 413 p. (104 p of text). 53 figs, numerous tables, 40 refs. German and Spanish summaries p 101. DAS M82.1/83 K96me.

German

...This study includes textual and tabulated meteorological data for Valdivia, southern Chile from May 1957 thru Apr 1958. The climatic station is described and the characteristics of the yearly and monthly climate are summarized. Soil and water temperatures are described and phenological studies included. The tables provide daily and monthly mean data on pressure; wind direction and speed; sunshine duration; solar radiation; cloud cover; precipitation; maximum, minimum, and range of temperature, minimum soil temperature; relative humidity; and water temperature. Hourly values of sunshine duration and precipitation amounts are listed. (VJC)

74. Kunkel, Gunther. Uber Frostwechsel und Kammeis in der sudchilenischen Kulturlandschaft [Days with Freezing and Thawing and Columnar Ice in the Cultivated Areas in Southern Chile], Archiv fur Meteorologie, Geophysik und Bioklimatologie, Ser 3, Vienna, Vol. 11, No. 3, 1962, pp 377-393. 3 figs, 5 tables, 20 refs. German, Spanish, English, and French summaries pp 377-378. DAS M(05) A673ab.

German

...Based on micro-climatological observations at Valdivia (southern Chile) and former observations at Mininco, local frost phenomena, their development and effects are discussed. Between May 1 and Oct 31, 1957, there was no "ice day" but 31 and 59 days with freezing and thawing according to the climatological and microclimatological observations,

## 74. (cont)

respectively. The freeze-thaw cycle occurs during days with clear weather, and varies with the type of soil and its cover. Simultaneous observations of the vegetation are used for a discussion of the ecological and agricultural importance of intermittent frost and the formation of columnar ice. (Author)

75. Kunkel, Gunther. Über den Waldtypus der Robinson-Insel [On the Forest Type of Robinson Island], Vol. 30, No. 5, May 1956, pp 129-137. Forschungen und Fortschritte, Berlin, 12 figs, table. DLC Q3.F6.

German

...This study of the vegetation of Robinson Island includes a section on climate (pp 130-132). Monthly means are given for Cumberland (33°37'S, 78°49'W) for 1954, and daily or hourly temperatures for Jan-Mar 1955 at Plazoleta del Yunque in the middle of the woods, with soil temperatures for March. Notes describe erosion by wind and heavy rain. (CEPB)

76. Miller, Arthur A. Climatology. Ninth Edition. London, 1961. 320 p. DAS M8 M647c.

English

...Contains monthly and annual tabular summaries for an unspecified period of mean temperature and mean rainfall for Santiago, Valdivia, Punta Arenas, Evangelistas Is., Iquique and Antofagasta. (VT)

77. Naruse, Renji and Endo, Teiichi. Glaciological Investigations of Northern Patagonian Glaciers, Chile. Japanese Society of Snow and Ice, Tokyo, Journal (Sep-pyo), Vol. 29, No. 6, Nov 1967, pp 167-176. Figs, photos, refs. English summary p 176. DAS M(05) J35jo.

Japanese

...From Feb 20 to Mar 27, 1967, 4 glaciers near Mt. San Valentin (46°35'S, 73°20'W, altitude 4058 m) in northern Patagonia were surveyed by the 2nd Patagonian Expedition of Hokkaido and Hiroshima Universities. The glaciological and meteorological works carried out on these glaciers are described and some results are given. The "fern" line in this region was observed to be 1200-1500 m above the sea level. The mean ablation rate for 5 days measured on the lower stream of the Soler Glacier was 9.2 cm/day, when the mean air temperature was about 11°C. The mean surface-flow velocity along the central line of this glacier was aprx 40 cm/day. (Author)

78. Navea Abarca, Esther. Estudio de la temperatura del aire y superficial del mar en Antofagasta, 1962-1965 [Study of the Air and Sea Surface Temperature in Antofagasta, 1962-1965], Estudios Oceanologicos, Antofagasta, Chile, Vol. 2, Oct 1966, pp 49-56. Figs, tables, refs. English and Spanish summaries. DAS P Col.

## 78. (cont)

...Presents the average air and water temperatures observed during the years 1962-1965 at a point along the coast near the Oceanology Laboratory of the University of Chile, Antofagasta. Upon comparing the monthly averages of sea temperature at specified hours of the day, it is possible to conclude that the maximum temperatures are at 1500 hrs and the minimum at 0800 hrs. The same occurs in the air, the greater average temperatures being at 1500 hrs and the lower at 0800 hrs. The warmest year was 1964, during which the summer temperatures of the atmosphere reached the average of 20.1°. The coldest year was also 1964, during which winter temperature of the atmosphere average 13°C. Sea temperatures did not follow this pattern exactly. The warmest water temperatures were recorded for the summer of 1963, during which the average was 19.75°C. The coldest water temperatures were recorded for the winter of 1964 with an average of 13.67°C. Upon comparing sea and air temperatures during the different seasons, a marked difference of more or less 1°C was observed in both averages. (Pt. Author Abst)

79. Pizarro Callejas, Hernan and Rivas, Rigoberto. Irregularidad de la precipitaciones en el Norte Chico, 1965 [Irregularity of Rain in North Chico, 1965], Santiago de Chile, Mar 23, 1965, 15p. 8 charts, 8 tables.

...Data on monthly, seasonal, and annual precipitation amounts at La Serena (1871-1964) and Ovalle (1897-1964) are tabulated and analyzed as to inter- and intra-annual variabilities. The rainfall regime in North Chico is found to be so irregular (with frequent periods of drought) that deficiencies in water supply present a recurrent problem. (GT)

80. Saá, R.P.G.E. and Valdéz, M. Captacion de Agua de la Neblina [Capturing of Water of the Mist], Universidad del Norte, Instituto de Investigaciones Cientificas, Antofagasta, 1963, 45 p. 9 refs, 13 figs, photos, tables. DAS 79/83 G373ca.

...Discusses collection of water from fog or mist in the arid regions around Antofagasta. Photographs illustrate the methods of collection which make use of nylon screens. The amount of water collected from the atmosphere by the various collectors is tabulated. A study of the thread diameters and the amount of water collected is described and graphed. (VJC)

81. Valenzuela, Frias. Manual de Geografia de Chile [Geographical Manual of Chile], Univ. of Chile, Nascimento, Santiago, 1963, 318 p. DPU Chi F 3064 .F8.

...Contains a section on climate and general comparisons between the arid and moist areas of Chile. Two stations (Valparaiso and Valdivia) are used to compare average monthly precipitation. (DLB)

82. Van Dorn, William G. Tsunami, American Geophysical Union, Transactions, 44(2):Jun 1963. pp 489-490. 10 refs. DAS P Col.

English

...Considerable progress was made in the basic understanding of the nature of tsunamis within the past 3 yrs. This period has seen the birth of a new Geophysics Inst. at the Univ. of Hawaii, with an oceanography section primarily interested in tsunami problems. The greatest tsunami of this century -- May 22, 1950 along the southern coast of Chile is discussed, and references are given to studies of its nature and effects. (EVS)

83. Van Husen, C. Klimagliederung in Chile auf der Basis von Häufigkeitsverteilungen der Niederschlagssummen [Climate Classification in Chile on the Basis of Frequency Distribution of Precipitation Totals], "Freiburger Geographische Hefte," Freiburg, No. 4, 1967, 113p. Figs, tables, biblio. pp 95-102. English and Spanish summaries pp 107-113. DLC GI.S7.

German

...On the basis of a frequency analysis of monthly precipitation, a climatic classification is developed. The following zones were established (latitudes refer to the Andean lowlands): 1) zone of regular precipitation throughout the year (45°S lat.); 2) zone of precipitation throughout the year but with a winter maximum (45°-41°S lat.); 3) zone of episodic summer drought (41°-38°S lat.); 4) zone of regular subtropical winter rain and periodic summer drought (48°-34°S lat.); 5) zone of episodic winter drought (34°-30°S lat.); and 6) zone of total annual drought (30°S-0°). The annual range of the frequency distribution of the monthly precipitation totals were analyzed and mapped diagrammatically for representative points in each zone. Extensive data are presented in tables and graphs. (ILD)

84. von Bauer, Peter-Paul. Waldbau in Südschile [The Structure of Forests in South Chile], Bonner Geographische Abhandlungen, Heft 23, Bonn, 1958, 120p. DAS M(055) B716 no. 23.

German

...Contains sections on vegetation, climate, soils, water, and forest structure of southern Chile. The section on climate reviews the occurrence (or lack of occurrence) of selected meteorological phenomena. The section dealing with water discusses precipitation and ground-water. Tabular data include: mean monthly temperature (by year, 1951-56); mean daily temperature (FOR 1951-1956); diurnal temperature variation for Feb, Apr, Jul, and Oct 1956; frequency and duration of frost in 1955; and rainfall -- days with rain, six-year total of rainfall by month, and mean monthly rainfall. All data are based on Puerto Varas, 41°12'S and 72°32'W. (DLB)

85. Weischet, Wolfgang. Ultima Esperanza, Departamento Magallanes/Chile [Ultima Esperanza, Department of Magallanes, Chile], "Die Erde," Berlin, 88(2), 1957, pp 128-138. 4 figs, photo, 19 refs. DAS P Col.

...This geographical description of one of Chile's southernmost territories, bordering upon Tierra del Fuego and separated from the rest of Chile by an unsettled forest region some 600 mi long, includes a section on climate based on records of the Sociedad Esplotadora de Tierra del

## 85. (cont)

Fuego. The three climatic features most characteristic of the region are:  
 1) steadily cool weather (monthly mean temperature range from 1.4 to 11.7°C),  
 2) prevalence of strong winds (annual average wind - 14 km/hr), and 3) great differences in precipitation (5000 mm/yr in the western part as opposed to 450 in the east) due to a mountain effect. Data on the annual march of precipitation (3 eastern stations) and on annual and diurnal march of temperatures at Punta Arenas (10 yrs) are presented. (VJC)

86. Weischet, Wolfgang. Zur Klimatologie der Nordchilenischen Wüste [Climatology of the desert in Northern Chile], "Meteorologische Rundschau," 19 Jahrgang, Jan/Feb, Heft 1, 1966, pp 1-7, 19 refs, 7 figs. DAS M(05) M587.

German

...This article presents the differences in climate throughout a desert area. Data are given for 6 stations: Iquique, Antofagasta, Pintabos, Lanchanes, Refresco, and Coya Sur. The data include: max-min temperature for Canchones, temperature-humidity differences at Coya Sur, and a topographical cross-section of Iquique. Also included are a station and climatic area map. (DLB)

## Uruguay (1951-1969)

87. Alvarez Noll, Darcy. Climatología [Climatology], From: Eshido geografico do Uruguay. Boletim Geografico, Rio de Janeiro, Vol. 18(156), May/Jun 1960, pp 440-444. DAS P Col.

...Contains a brief discussion of the distribution of temperature and precipitation over Uruguay; also includes winds, humidity, frost, snow, and hail. Only data presentation is in the form of maps; coverage: Uruguay only, scale, 1:52, 840,000, mean temperature, Jan & Jul only, and mean annual precipitation amount. (VJC)

88. Battione Chiarino, J.A. Análisis de 50 años de temperatura del Observatorio del Prado [Analysis of 50 Years of Temperature from the Prado Observatory]; I, Valores primarios; II, Lapsos homotermos; "Revista Meteorologica," Montevideo, Nov 1966 and Mar 1967, 58p and 15p. Graphs, tables. DAS M(05) U820. Suppl. 1966, 1967.

...Part one gives a statistical analysis of temperature: mean, maximum, minimum, and absolute maximum and minimum for 50 years of record (1902 - 56 less 1925 - 29) by hour, day, month, and year. These values are presented in graphs and tables. A brief explanation is given. Part II describes the



## 88. (cont)

method used, treatment of the data, and the results obtained. A table lists the 5-day mean, daily maximum and minimum, and absolute maximum and minimum temperature. Graphs illustrate these 5-day mean values. (VJC)

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89. Battione Chiarino, J.A. Distribución por clases, de 60 años de lluvia diaria del Observatorio del Prado [Distribution, by Classes, of 60 Years of Daily Rainfall at the Prado Observatory], "Suplemento de la Revista Meteorológica," Montevideo, Aug 1966, 10p. 7 refs, 5 tables, 1 graph. DAS M(05) U820 Aug & Nov Suppl, 1966.

...This study analyzes the distribution of rainfall by classes from 1 to 10 days during the period 1906 to 1965. The author discusses the unity and source of the data, the treatment of the information, and the results obtained. The tables show the monthly, seasonal, and annual no. of cases of rainfall occurrence and percent frequency of rainfall occurrences of 1 day, 2 days, ... to 10 days. (VJC)

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90. Battione Chiarino, J.A. Resumen mensual de los valores meteorológicos correspondientes al Observatorio del Prado, periodo 1901-1950 [Monthly Resume of Meteorological Values at the Prado Observatory, 1901-1950], Revista Meteorologica, Montevideo Vol. 14(50-51), Jun-Dec 1956. pp 29-54. DAS M(05) U820.

...For Montevideo, monthly tables based on data for 1901-1950, of temperature (mean, mean and absolute extremes; mean and extreme ground temperatures and wet-bulb temperatures), humidity (mean and extremes), evaporation (mean and extremes), hours with sunshine, cloudiness (mean, number of days with specified amounts, etc.), precipitation (amount, number of days, and 1-minute, 1-hour, and 24-hour maxima), and pressure (mean and extremes). (VJC)

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91. Bergeiro Hargain, José María. Actualización de los valores climatológicos normales, correspondientes a Montevideo [Compilation of the Normal Climatological Values of Montevideo], Revista Meteorologica, Montevideo, Vol. 13(48) Jun 1955. pp 15-24. 8 figs. DAS M(05) U820.

...Monthly and seasonal values for Montevideo are given in graphs or tables. They include means and absolute and mean extremes of temperature and relative humidity (1904-53), hourly means of wind velocity (1906-54) and means and extremes of pressure (1901-53). A graph of diurnal variation of temperature for Jan illustrates the cold and hot periods of the day. (VJC)

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92. Bergeiro Hargain, José María. Apuntes de estadigrafía climatológica, con intercalación de criterios y tesis personales [Notes on Climatological Statistics, with the Interrelation between Criteria and Personal Thesis], Montevideo, Ministerio de Defensa Nacional, Servicio Meteorológico del Uruguay, 1956, 50p. Graphs, tables. DAS P Col.

## 92. (cont)

...This monograph is a compilation of information on statistical methods of working up ordinary climatological data, especially temperature (at Montevideo), with respect to means, extremes, variability, time averages, smoothing, normals, interdiurnal variations or cycles, applications to bioclimatology, etc. The more advanced statistical concepts are not introduced. Numerous terms used in climatological statistics are defined systematically. (Author)

93. Chiazaro, Leandro and Gonzalez, Juan. Normales horarias de la temperatura y humedad atmosférica [Hourly Normals of Atmospheric Temperature and Humidity], *Revista Meteorologica*, Vol. 12(44-45) Jun-Dec 1953. pp 97-99. DAS M(05) U820.

...Tables of means for each hour of the day of temperature and relative humidity, by month, for the periods 1906-1924, 1931-1952, and 1906-1952, for Montevideo. (VJC)

94. Christiansen, J.E. Irrigation and Drainage Problems in Uruguay. American Society of Civil Engineers, Irrigation and Drainage Div., Journal 86(2) Part 1, Jun 1960, pp 1-8. 2 figs, 3 tables, foot-ref. DLC TAL.A5.

**English**

...Uruguay irrigates about 65,000 acres, mostly rice (74%) and sugar cane (15%). Summer rainfall averages about 3.5" per month but frequent droughts seriously affect both crops and livestock. Irrigation can be increased by storage in small reservoirs on tributary streams by means of low-earth dams. Some areas will require flood control and drainage before intensive agriculture can be practised. (Author)

95. Interamerican Committee for Agricultural Development, Uruguay. "Inventario de la Información Básica para la Programación del Desarrollo Agrícola en la América Latina," pub. by Pan American Union, Washington, D.C. (1963), 68 p. Tables. ESSA, EDS, Foreign Section Files.

...A brief summary is given on the climate and the meteorological service. A few pages are devoted to hydrology, soils, topography, and vegetation. (VJC)

96. Lagarmilla, R.E. Aspectos del estudio de la radiación solar [Aspects of the Study of Solar Radiation], "Revista Meteorologica Montevideo," Vol. 8(31) Oct 1949. pp 382-409. DAS M(05) U820.

...Monthly data presented month-by-month for Montevideo. Measurements were taken of global radiation with clear, partly cloudy, cloudy with openings, and overcast sky at 09 and 15 LT for Jul 1947-Jan 1949. (VJC)

97. Morandi, Luis. Calmas relativas y vientos impetuosos en el clima de Montevideo [Calms and High Winds in the Climate of Montevideo], "Revista Meteorologica," Vol. 11(42-43) 1952, pp 253-283. DAS M(05) U820.

...Presentation of hourly frequencies of calms and wind speeds greater than 46 kt, and daily frequencies of wind directions accompanying high winds, by months, for Montevideo, based on data for 1900-1923. (GT)

98. Morandi, Luis. Síntesis de las características fundamentales del clima del Uruguay [Summary of the Basic Features of the Climate of Uruguay], "Revista Meteorologica," Vol. 11(39-40) Oct 1951-Jan 1952. pp 197-207. DAS M(05) U820.

...Annual and seasonal means and extremes of temperature, pressure, humidity, wind, rainfall, and days with thunderstorms, fog, hail, and frost, based mainly on records for Montevideo, are cited and very briefly discussed. Bergeiro's isothermal and isohyetal maps of Uruguay are presented as well as a table of annual frequencies of specified rainfall amounts at 10 stations. (VJC)

99. Rivero, R.O. and de Vanini, M.C.G. Frecuencias y Valores Medios para la Insolacion y Nubosidad en Montevideo [Frequency and Mean Values of Insolation and Cloudiness in Montevideo], Servicio de Climatología Aplicada a la Arquitectura, Pub. S.C. 2, Montevideo, Dec 1955, 15 p. Tables, 1 fig. ESSA, EDS Foreign Sec.

...The definition and significance of insolation, cloudiness, and clear sky are given. The mean values of insolation and clear sky are discussed and their analysis and determination of class intervals as well as the relation between insolation and clear sky. The period of record used is 1935-1964 for insolation and 1935-55 for cloudiness. Cloudiness is given as 100 minus clear sky in percent. A graph shows the mean 10-day intervals of insolation and clear sky. The mean monthly values of days with clear sky and insolation by 10-day intervals are given by class intervals of 0-20, 20-40, 40-60, 60-80, and 80-100. Other tables give the frequency of insolation and clear sky. (VJC)

100. Siemonsen, Ferdinand. Das Hochwasser im Rio-Negro-Gebiet in Uruguay im April 1959 [Flood in the Rio-Negro Area in Uruguay in April 1959], Die Wasserwirtschaft, Stuttgart, Vol. 50(10) 1960. pp 271-275. 13 figs, 5 refs. DLC TCL.W275.

German

...The author describes the dams and hydro-electric stations constructed at Rincon del Bonete and Rincon del Baygozzia on the Rio Negro in Uruguay, the water-level regime of the river at these two points, the intense rainfall that fell in April and, particularly during May 12-16, 1959, the resulting floods that occurred. Graphs showing water level at Baygozzia, mean water influx per month at Rincon del Bonete, etc. are presented. Measures for preventing such flood occurrences are outlined. (Author)

101. Tiscornia, Jose. Las Lluvias en el Uruguay estudiadas desde el punto de vista de su intensidad y las consecuencias agrícolas pertinentes [Rainfall Intensity in Uruguay and Its Effects on Agriculture], "Revista Meteorologica," Montevideo, Vol. 12(44/45) : /Dec 1953. pp 22-37. Figs, tables. DAS M(05) U820.

...A table of annual percentage frequencies of very intense and torrential rains and one of monthly percentage of rainfall exceeding 100 mm are presented. They are based on records obtained at various stations in Uruguay during the period 1881-1950. The problem of soil erosion as a function of rainfall intensity and duration is discussed (LYON and BUCKMAN). (OT)

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102. Uruguay. Servicio Met. Algunas estadísticas climatológicas del Uruguay [Some Climatological Statistics of Uruguay], Revista Meteorologica, Montevideo, Vol. 14(50-51), Jun-Dec 1956. pp 14-22, tables. DAS M(05) U820.

...Presents statistics of monthly means and extremes of cloudiness, temperatures, humidity, insolation, etc. in Uruguay. In addition, tables list normal hourly cloud and rainfall amount; mean monthly rainfall-amounts, no. of days with greater than specified amounts, and maximum 24-hour amount for Montevideo. Also, the monthly rainfall amounts are given for the 19 Departments of Uruguay. (VJC)

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103. Uruguay. Ministerio de Defensa Nacional. Estadísticas Climatológicas [Climatological Statistics], "Revista Meteorologica," Año XVI - No. 54, Montevideo, 1960-65. Entirely tables. DAS M(05) U820.

...Fourteen stations have climatological summaries on a monthly and annual basis mainly for the period 1940-1960. The Montevideo (Prado) observatory has summarized data on soil temperatures (1931-55), month-by-month and year-by-year mean temperature (1882-1963), mean relative humidity, total precipitation, and evaporation. Another section lists wind frequency for 16 cities based on five years of record, mainly 1940-1944. Precipitation: mean monthly, seasonal, and annual; also maximum and minimum is given for 19 stations summarized over 1914-1962. (VJC)

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104. Uruguay. Servicio Meteorológico. Estadística de Techo y Visibilidad [Ceiling and Visibility Statistics], 1st Edition, Sep 1954. DAS M 91.3 U820 1954.

...Summarized data of ceiling and visibility are given based on hourly observations made at the National Airport of Carrasco during the years 1949-53. The condition observed is for ceiling less than 200 meters and visibility less than 1000 meters. Three summaries are given: 1) monthly totals of days and hours, 2) daily totals of hours, and 3) mean hourly frequency. (VJC)

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105. Uruguay. Direccion General de Meteorologia. La Lluvias en el Uruguay [The Rainfall in Uruguay], "Revista Meteorologica". Suppl. No. 3, Montevideo, 1963. 117p. Tables, maps. DAS M(05) U820, 1963 Suppl. No. 3.

...Precipitation is integrated for many stations and presented as monthly, seasonal, and annual averages by Department. The period of record is 1914-1962. Mean monthly, and annual maps of Uruguay show isohyets and days of rain. (VJC)

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106. Uruguay. Junta Nal. de Meteorologia. Revista Meteorologica [Meteorological Review], Montevideo, 1955-57. DAS M(05) U820.

...Published twice annually. Contains articles on the meteorology and climatology of Uruguay. The June-December 1956 issue contains the following summarized data for El Observatorio Meteorologico del Prado (Montevideo): mean monthly temperatures at the sfc - absolute max. absolute min., mean max. and mean min; POR 1901-1950. For La Sombra - mean temperature and rainfall by month and season from 1882-1897, and for 1951-55. Also monthly, seasonal, and annual rainfall rates & statistics for Observatorio del Prado, POR 1901-54, and cloud cover 1942-55. Rainfall normals (monthly, seasonal, annual) for twenty stations, POR 1914-53. The following data is also presented for Observatorio del Prado: POR 1901-1950, monthly and seasonal-temperature in shelter, outdoors at 1½ meters above sfc mean, mean & absolute max. & min; relative humidity; evaporation; sunshine; cloud-cover; precipitation in mm; standard atmospheric pressure in mm. The June-December 1957 issue contains yearly summarized data by month for the period 1944 to 1956 for the following stations: Artigas, Salto, Tacuarembó, Colonia, Montevideo, Maldonado. The tabulated data include: temperature, mean, max., min; atmospheric pressure; relative humidity evaporation; wind speed and direction; rainfall in mm; and cloud cover. (VJC)

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107. Uruguay, Servicio Meteorológico, Anuario. Años 1944 al 1956 [Yearbook, 1944-1956], "Revista Meteorológica, Vol. 15(52-53) Jun-Dec 1957. pp 5-112. Tables. DAS M(05) U820.

...This issue of the Revista Meteorológica is devoted entirely to year-book data for 6 stations. For the months of individual years, 1944-56, are given temperatures -- mean, mean and absolute extremes; pressure -- sea level, mean and extremes; mean and extreme humidities; mean and extreme vapor pressures; predominant wind direction and mean speed; mean precipitation amount and number of days with precipitation; mean and extreme evaporation; cloud -- mean; amount and number of days clear and cloudy; and number of days with frost hail, fog; and thunderstorms. For the central observatory at Del Prado, additional data on earth and gross temperatures, maximum winds, insolation, etc., are included. (RES)

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## LIST OF USAF ETAL TECHNICAL NOTES

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68-1	Superseded	
68-2	Meteorological Rocket Data and Predicting the Onset of the Southwest Monsoon over India and Southeast Asia (AD-669364)	May 68
68-3	Bibliographies of Climatic References and Climatic Maps for Selected Countries (AD-672769)	Jul 68
68-4	Climatological Bibliography of the South Atlantic Ocean Area Including Certain Coastal Countries (AD-683761)	Nov 68
69-1	Selected Climatological Bibliography for Thailand (AD-685716)	Mar 69
69-2	Superseded	
69-3	An Annotated Climatological Bibliography of Romania (AD-688259)	May 69
69-4	Radar-Computed Rainfall Compared with Observations from a Dense Network of Rain Gauges (AD-688434)	Jun 69
69-5	Tractionability Study for Laotian Panhandle (AD-691006)	Jul 69
69-6	An Annotated Climatological Bibliography of India (AD-691432)	Aug 69
69-7	A Selected Bibliography on the Climate of the Central American Countries (AD-695482)	Sep 69
69-8	A Selected Annotated Bibliography on Lightning (1964-1969) (AD-697020)	Nov 69
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